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# THE PROBLEM OF THE POSTMATURE INFANT.

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THE problem of the postmature infant differs in a very striking way from that of the premature infant. The latter can with difficulty be kept in life after birth; the former can with difficulty be born alive. The premature child comes too early into extra-uterine surroundings, and is face to face with the difficulty of behaving in all respects as a new-born infant when he is only a fœtus, and is not prepared to be anything but a fœtus; his troubles begin after birth. The postmature infant, on the other hand, has stayed too long in intra-uterine surroundings; he has remained so long *in utero* that his difficulty is to be born with safety to himself and his mother; his troubles come on during birth. The problem of the premature infant is postnatal; that of the postmature infant is intranatal. In the solving of the former, both the obstetrician and the pediatric physician play a part; the obstetrician alone is concerned with the latter.

Yet the problems present a resemblance; in both it is a disturbance of the time relations of gestation which is the source of the difficulty and the origin of the problem. It were well for the infant if the guiding principle of *nec cito nec tardo* could be established with regard to his advent into extra-uterine surroundings. *Festinare nocet, nocet et cunctatio sæpe*—Hurry is bad, and delay also is often bad:

'Raw Haste is half-sister to Delay.' Expedition without precipitancy, deliberateness but not procrastination, might well be the rules of conduct in antenatal as well as in postnatal affairs. To be expelled timeously from the uterus is almost as important as to be nourished perfectly in it. To be born too late is likely to be disastrous, and there is danger in being born before the time.

Here, however, the resemblance between the problems ceases; for prematurity gives rise to one kind of deviation from the normal, and postmaturity gives rise to another and a very different kind. The *partus præcox* is one thing, and the *partus serotinus* another, although in both the abnormality lies in the date of the supervention of labour. When the infant loses his time relations it may be questioned whether it is worse for him to come before or after his time into extra-uterine life; but there can be no doubt at all that the risks run by the premature baby are quite unlike those encountered by the postmature. Further, the treatment called for is very dissimilar in the two cases; theoretically, no doubt, it ought to be the same, and should consist in prevention, but in practice it differs markedly, being in the one instance directed towards the infant, and in the other towards the mother, and being in neither truly preventive. There is, then, a strong contrast between the problems, and they call, therefore, for separate consideration. The problem of the premature infant I have dealt with elsewhere (*British Medical Journal*, May 17, 1902); that of the postmature has now to be discussed.

## Definition of Postmaturity.

It is comparatively easy to state what is meant by a postmature infant, just as it is easy to explain in a general fashion what is meant by a premature one; but in both cases it is very difficult to fix limits with any degree of accuracy and to give exact definitions of the terms employed.

The difficulty in dealing with the premature infant arose in connection with the definition and delimitation of viability. It was no easy matter to determine when immaturity ceased and prematurity began, for the good reason that there was a variability of viability, and circumstances were found to alter cases. The seven-months infant of healthy parents might be justly termed viable, while the seven-months infant of a syphilitic mother might be as justly termed non-viable. Age does not entirely determine viability. There may apparently be an acceleration or a retardation of the vital

processes *in utero*, with results which tend to confusion when attempts are made to settle the chronology of antenatal life. So, in treating of the postmature infant, it is a perplexing question to fix the date of maturity and to define overmaturity. By a postmature baby is generally understood a new-born infant weighing more than the average number of pounds, expelled from the uterus at a date later than that which has been regarded (after careful calculation) as the normal date for delivery, and showing certain anatomical and physiological characters belonging to the infant of a few weeks old rather than to the full-time fœtus. This, however, is a short description rather than a definition, and does not meet the requirements of legal accuracy. The premature infant must be viable and less than mature; the postmature infant must not simply be mature, he must be more than mature; he must be not only ripe, but over-ripe. Since both viability and maturity must be regarded as variable, it follows that neither prematurity nor postmaturity can be strictly defined.

It is therefore impossible to fix exactly the date in pregnancy when an infant begins to be postmature; but, further, it is also impossible to state the time beyond which an infant can no longer be retained alive in the uterus. There is no *ultimum tempus pariendi*. For, let it be observed, a prolonged pregnancy need not necessarily result in the birth of a postmature infant; the fœtus may die *in utero* at the full term, and not be expelled for a fortnight or longer. Under these circumstances the labour may be described as postmature, but the product of it is not a postmature infant. Time spent in the uterus, then, is not the only criterion of postmaturity. The fœtus must continue to live on in the uterus after the full term of pregnancy, and one cannot fix the date beyond which it is impossible for it to continue to survive, and to be capable ultimately of live birth. The law, however, which has attempted to fix the earliest date of viability, has also tried to settle the extreme limit of fœtal residence in the uterus, in order to decide vexed questions of legitimacy and paternity. It has not been altogether successful in either case; for in different countries there is a difference in the limit fixed, while in some codes no definite number of days is mentioned at all, and in actual practice the decision come to is often based upon reasons and evidence other than medical. So, in the case referred to by W. A. Thomson (*Trans. Obstet. Soc. Lond.*, xxvii. 308, 1886), in which labour occurred 301 days after coitus and 317 days after the last menses, the child would have been legitimate by Prussian law, illegitimate according to Scottish and French law, while English

law would have taken into account the moral aspect of the case in coming to a decision. These are circumstances which are eloquent of the uncertainty which exists in the matter.

It may at once be stated that neither the dimensions of the fœtus, nor the degree of development of his tissues and organs, nor the history of the pregnancy, can be taken as certain proof of postmaturity. There are great variations in the weight and measurements of the full-time infant, the condition of the organs and skeleton (*e.g.*, the ossific nuclei in the epiphyses of the long bones) is by no means always the same, and the statements of the parents cannot, of course, be accepted as scientifically accurate, even if there be no reason to doubt their veracity. At the same time, for the purposes of this article, written as it is from the medical rather than from the legal standpoint, it is unnecessary to give an exact definition of post-maturity. I take not an extreme but an average case, not a dubious but an obvious instance. I call that infant postmature who is born after a pregnancy which can be reasonably reckoned as having lasted for ten calendar months (or longer); who has a weight and size greater than what is normal for the mature infant; who has been alive *in utero* for some days, at any rate, after the full term of gestation was passed; and whose organs and tissues exhibit some at least of the characters of postmaturity which are later to be described.

### Illustrative Cases.

I. Mrs. A. was thirty-nine years of age when she first became pregnant, and her husband at that time was fifty-five. Her menstruation had always been regular, and of the twenty-eight-day type. She expected her confinement on or about November 16, 1892, but labour pains did not supervene till December 23. The labour was evidently a very prolonged one, for both her own medical man and a consultant were in attendance, and ultimately craniotomy had to be performed in order to extract the child, a large male. She had a miscarriage in August of the next year (1893), and in the spring of 1894 I was engaged to attend her at her confinement, which was expected in July. She had been taking chlorate of potash since she knew she was pregnant for the third time, and this medicine I ordered her to continue till near the full term. From the menstrual history and other details, it was calculated that labour would occur about July 20; but the patient herself assured me that I had better make my arrangements for attending her about August 20, as she had gone past her dates in her first pregnancy. I remained, however,

in town during the second half of July and the first half of August, awaiting the confinement. My waiting continued till August 20, when, after a prolonged labour, I succeeded, by means of forceps, in extracting a large living male child. A few days after birth the infant developed œdema neonatorum of a very marked type, was seriously ill for about ten days, but thereafter completely recovered. He did not walk, however, till the end of his second year. He is at the present time healthy and strong.

In the August of the next year (1895) my patient aborted for the second time. She became pregnant again in 1895, and, curiously enough, her labour was due once more on July 20. On this occasion I made my arrangements as if it were due on August 20, and as a matter of fact Mrs. A. was delivered of a girl on the 19th of that month. Short forceps were needed in this instance, and the infant was of large size for a female. The patient had in this pregnancy, as in the former one, been taking chlorate of potash. She did not recover so quickly after this confinement, and suffered from menorrhagia and leucorrhœa due to endometritis; I curetted the uterus in the August of the next year (1897). She did not again become pregnant till the autumn of 1899. In this pregnancy I did not advise her to take any chlorate of potash, as I trusted that the curettage might have brought about a healthy condition of the endometrium, and that there would in consequence be less risk of abortion. Labour, by ordinary calculations, was due on April 28, but, being warned by previous experiences, I looked for it about the end of May. Labour pains came on, however, on May 12, or only a fortnight later than the ordinary full term. Forceps were needed. The infant, a female, was a little above the average size and weight. It should be added that the patient was recovering from influenza when labour came on, and that she had alarming primary postpartum hæmorrhage. She made, however, a thoroughly good recovery. She has now (1902) reached the menopause, being forty-nine years old; she is perfectly healthy.

*Notes.*—In this somewhat remarkable record it is to be noted that the parents were both advanced in years before marriage, and that all the living children (three) were born after the mother was forty years old. There were in all six pregnancies; two of them ended in miscarriage about the third month, and the other four all went beyond the full term. Three of the labours were one month overdue, and one was about a fortnight postmature; possibly in this case the influenza may have expedited the onset of labour pains and so prevented the full degree of postmaturity. In two of the post-

mature confinements the patient had been taking chlorate of potash in doses of from 20 to 40 grs. daily during the greater part of the pregnancy. In the three labours at which I was in attendance, the fœtal head lay somewhat transversely at the brim, and on all these occasions I used forceps. The children, a boy and two girls, were all large and heavy at birth (I should say they were well above 8 pounds); their heads were all well ossified. They were all nursed by the mother, but they all showed signs of rickets, the youngest one most markedly. None of them walked till the age of two years.

II. Mrs. B. was sent to consult me in 1893 by Dr. A. T. Sloan, of Edinburgh. I had previously examined a still-born infant to which she had given birth on April 6 of that year. The history was as follows: Mrs. B. had had three children in the country, all large and well formed, but all still-born. In her fourth pregnancy she came to town to be under the care of Dr. Sloan. Labour supervened on April 6, 1893—according to the woman's reckoning, three weeks after the full term. There was delay from the large size of the infant, and the use of forceps was necessary to deliver the child, which was still-born and could not be resuscitated, although efforts were made for a long time. The placenta appeared normal; the mother's pelvis was not contracted. I made a series of ten frozen sections of the infant, a male, in order to try to discover the cause of the still-birth. Nine of these sections are reproduced in colour in my work 'Manual of Antenatal Pathology,' where they constitute Plates I. to IX. The infant was so well developed and so mature in appearance that it resembled more a baby of several months than a new-born child. Its weight was 4,780 grm. (about 9½ pounds), the length from vertex to heel was 56 cm., and from vertex to symphysis pubis 36·5 cm. The circumference of the head in the O.F. plane was 38·5 cm., in the O.M. 42·5 cm., and in the S.O.B. 37 cm. The circumference of the trunk round the shoulders was 43·5 cm., at the level of the nipples 36 cm., at that of the ensiform cartilage 40 cm., at that of the umbilicus 37 cm., and at a level an inch above the last-named 39 cm. The thigh measured 19 cm. in girth, the leg 13·5 cm., the upper arm 13 cm., and the forearm 11·5 cm. The infant was, therefore, a large one; but its size alone was not such as to prevent its safe passage through a normal pelvis. The head, however, when viewed from above, was seen to be more nearly square than ovoid in shape, and on closer examination it was found that the anterior fontanelle was scarcely larger than a threepenny piece, and that all the bones were unusually well ossified and

nearly immovable at the sutures, but the occiput felt loose in its attachments. The infant was put in the freezing mixture, and sections were then made of it—one mesial sagittal in the region of the head, and nine horizontal at various levels in the trunk.

The mesial sagittal section of the head is reproduced in Fig. 1. Unfortunately, the middle line has been missed in the posterior part of the head, and so the spinal cord and medulla are not shown; this result was largely due to the advanced ossification of the cranium, which made it difficult for the saw to keep the mesial plane. Never-

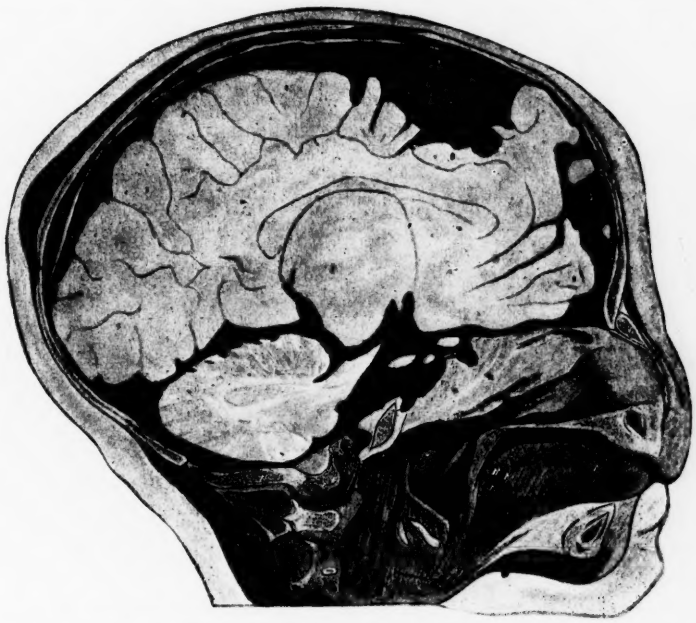

FIG. 1.—SAGITTAL SECTION OF HEAD OF POSTMATURE INFANT, SHOWING SMALL SIZE OF ANTERIOR FONTANELLE, FRACTURES OF OCCIPUT AND FRONTAL BONES, AND EXTENSIVE INTRACRANIAL HÆMORRHAGES. (Reduced by one-third.)

theless, the leading anatomical characters are well displayed. The small size of the anterior fontanelle is very evident; the posterior fontanelle does not exist; there is a fracture of the occiput at the level of its so-called 'cartilaginous hinge' (which in this case was osseous, and not a hinge till fractured); and the frontal bone is driven markedly inwards just above the root of the nose. The brain is unusually well developed. The median aspect of the left hemisphere of the cerebrum is seen in the section (Fig. 1); the corpus callosum and gyrus fornicatus are well displayed, and so are the

cuneus and precuneus and the associated fissures; a great part of the marginal convolution, however, is obscured from view by blood-clot, and clot also is seen at the basis cranii and around the cerebellum. Further dissection in the region of the neck led to the discovery of blood in the vertebral canal. It is evident, therefore, that the cause of still-birth was intracranial hæmorrhage, due, no doubt, to rupture of the superior longitudinal sinus and to fracture of the cranial bones. It is to be noted that the ossification of all the cranial bones is well advanced, and that there is a plentiful growth of hair on the scalp.

The transverse sections (reproduced in the 'Manual of Antenatal Pathology') showed that the trunk as well as the head of this infant was far advanced in development. The foramen ovale of the heart was nearly closed; the bladder was distended with urine; the lower part of the descending colon, the sigmoid flexure, and the rectum were all overdistended with meconium; the liver did not descend so low in the abdomen as it does in full-time or premature fœtuses; the kidneys showed no signs of lobulation; the thymus gland lay to the right side of the heart rather than to the front of it (being possibly displaced laterally by the large size of the heart, the displacement being also permitted by the undistended state of the right lung); and all the bones and muscles were more than usually well developed, both as regards size and structure.

*Notes.*—There can be no doubt that in this case the fœtus was both postmature and unusually well developed, for three weeks longer time spent in the uterus could hardly account for the large measurements and for the advanced degree of ossification of the bones. It was for this reason that I advised the patient, if she again became pregnant, to have labour induced at the eighth month. I do not know whether my advice was followed, or, indeed, whether there was ever another pregnancy. There can be no doubt that with such an infant a full-time labour, completed with the help of forceps, became in reality a craniotomy.

III. Mrs. C., a patient under the care of Dr. R. A. Lundie (Edinburgh), gave birth to an anencephalic fœtus in February, 1895. Dr. Lundie gave me the fœtus, and I examined it both by frozen sections and by dissection. I also saw the patient, and obtained from her and from her medical attendant the following interesting history:*

* This history was reported by me under the title of 'A Problem in Antenatal Pathology: Recurrent Monstriparity,' in the *American Journal of Obstetrics*, xli. 577, 1900.

She was married at the age of twenty-three to a man two years her senior. Within a year thereafter (1889) she gave birth at the full term to a living normal male infant, who still lives. The pregnancy was normal. Two years later (1891) she had her second child, also a boy, under similar happy circumstances, and with a like happy issue. In 1892 she aborted in the second or third month of her third pregnancy, and in 1893 she gave birth to a dead hydrocephalic female fœtus, with absence of the right thumb and radius. The fœtus had been dead for two or three days *in utero;* it weighed 3,270 grm., and had a length of 54 cm.; the placenta, membranes, and cord had, it was stated, a normal appearance. At the time of this confinement it was noted that the mother showed marked imperfect development of the short muscles of both thumbs, and that her mother and a sister suffered from the same anomaly. In 1894 her fifth gestation ended in the birth of a living normal female infant, who still lives.

The patient's next pregnancy (sixth) is the one with which I have here specially to do. It was prolonged to about eleven months, in accordance with the mother's statement, and with calculations based upon the data given by her. It ended in the birth of another female fœtus, weighing 3,520 grm. and measuring 45 cm. in length, and showing quite a number of malformations. It was anencephalic, a fact which probably served to explain why the weight was not greater for the size; it had a localized spina bifida in the lumbar region; one foot was in a condition of talipes calcaneus; the right thumb was malformed and attached by soft tissues only to the hand; and the fœtal membranes and placenta were connected with the margin of the spinal defect by an amniotic band. As Dr. Lundie was not present at the birth of the fœtus, it cannot be determined if the liquor amnii were normal in amount or not; there was no evidence, however, that it had been excessive, and the probabilities are that it was small in quantity.

This happened in 1895. In 1898 another female infant was born, who lived only for five weeks, being delicate from the first. In 1900 this unfortunate woman again gave birth to a female infant, evidently premature, of small size (weight, 1,320 grm.; length, 39 cm.), with absence of both radii, with absence of the right thumb, and with defective development of the left, which was attached to the hand by a narrow piece of skin. This infant was born alive, and survived birth for three days. The placenta was small, and the cord was inserted into the margin of it (battledore). Dissection revealed commencing hydrocephalus. Since 1900 the woman has had a living female child, well formed.

*Notes.*—It is an interesting fact in this most remarkable history that postmaturity and prematurity were met with in the same patient. In this respect the case resembled that of Mrs. A. Here, however, there were malformations as well, both of the fœtus and of the placenta and membranes. There seems to be no doubt that the anencephalic fœtus was postmature, and the fact that its weight was comparatively small is not evidence against this, for in anencephaly some 400 or 500 grm. may be safely added to the weight to allow for the absence of the cranial vault and brains.

IV. Mrs. D. was under the care of Dr. Charles Martin, of Newton Abbot, South Devon. She gave birth to a postmature anencephalic fœtus in 1895, in which year Dr. Martin kindly sent me the following details. There was strong evidence that the fœtus had been retained *in utero* alive for ten and a half months, delivery taking place 320 days after the commencement of the last period, and six months after quickening. Its finger and toe-nails had grown much beyond the tips of the digits. There was no hydramnios. The fœtus (anencephalic though it was) weighed 10 pounds ; it died during delivery.

*Notes.*—The fact that this second case of postmaturity with anencephalus of the fœtus occurred so soon after the one noted by Dr. Lundie led me to look into the history of anencephalics. Out of some thirty-five cases which were reported in the *Edinburgh Medical and Surgical Journal*, the *Edinburgh Monthly Journal of Medical Science*, and the *Edinburgh Medical Journal*, I found only one in which the pregnancy was said to have been prolonged (a fortnight past the full term). This was the case noted by Dr. Frazer in the *Edinburgh Medical Journal*, vol. xvii., p. 78, 1871-72. I was inclined to think that perhaps the absence of the cranial vault along with the absence of hydramnios might in these two cases have tended to allow pregnancy to be protracted. Certainly, in most cases of anencephalus labour occurs prematurely, but then there is usually hydramnios to overdistend the uterus and excite labour pains. I did not, however, speculate much concerning the matter, for there were evidently many factors involved ; and I dismissed the question from my mind, with the reflection that the association of postmaturity and anencephalus was probably a coincidence and not a consequence. In 1900, however, my attention was drawn anew to the subject by the occurrence of the case now to be recorded.

V. Miss E.—On June 13, 1900, Dr. C. Kennedy sent to me for examination an anencephalic fœtus which had been born that morning. It was a male and illegitimate. The mother's last menstrual

period had been the middle of June, 1899, and it was alleged that coitus took place on June 21 and on July 21 of that year, and not again until the end of October. The fœtal movements were felt early in December. The birth was expected in the beginning of April, 1900, but did not occur till June 13. The fœtus was very large; although it was anencephalic, yet it weighed 4,490 grm. (9 pounds), and had a length of 55 cm. The placenta weighed 675 grm., and had a diameter of from 16 to 17·5 cm. It had been a forceps case, and there had been great delay in getting the enormous shoulders through the vulva. There was no hydramnios. The anencephalic head had presented, and there had been difficulty in getting the forceps to hold. Before this pregnancy the mother, who was a healthy, well-made woman of thirty years, had never missed a menstrual period, but had been somewhat irregular, going six weeks at one time and three weeks at another. She suffered from very slight sickness in the pregnancy.

The sectional appearances of this anencephalic fœtus are represented in Fig. 2, a sagittal section of the head and trunk. The representation gives no real idea of the great bulk of the fœtus; for it must be borne in mind that it is reduced to one-third the natural size (*circa*). The circumference of the shoulders was 42 cm., that of the abdomen at the level of the umbilicus 34 cm.; that of the thigh 21 cm.; of the leg 13 cm.; of the upper arm 14 cm.; and that of the forearm 11·5 cm. From vertex to perineum measured 36 cm. The subcutaneous adipose tissue of the thigh was nearly 2 cm. in depth. Above the lumbar region the section has passed to the left of the middle line, a circumstance due partly to an inclination of the vertebral column to the side, and partly to the marked ossification, which made sawing difficult. The sectional appearances present a curious blending of postmature and premature features; and further dissection confirmed this observation. For instance, the bodies of the vertebræ were unusually far advanced in ossification, while the bones of the cranial vault, with the exception of part of the supra-occiput, were not developed at all. Again, the liver had a size and relation to the spine and umbilicus more in accordance with infantile than fœtal conditions, while the testicles were undescended and lay over the internal inguinal rings. The greatest part of the meconium was low down in the large intestine, yet a loop of the sigmoid flexure still occupied the pelvic cavity (lying behind the bladder). The nails were well developed, and projected beyond the digits, yet on microscopic examination of the skin (of the thigh) no hairs could be seen. The organs of the neck

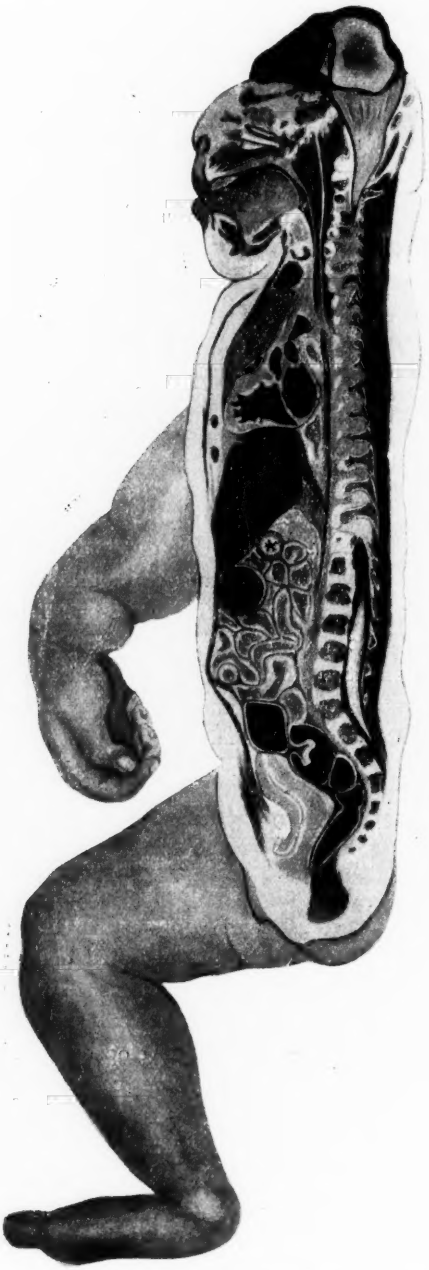

FIG. 2.—SAGITTAL SECTION OF ANENCEPHALIC POSTMATURE FŒTUS, SHOWING ANATOMICAL PECULIARITIES DESCRIBED IN THE TEXT. (One-third natural size.)

(hyoid, larynx, thyroid, gland, epiglottis) were all at a lower level than they usually are in the fœtus, and yet the stomach had its fœtal size, shape, and relations (it lay entirely under the left lobe of the liver). The foramen ovale was nearly closed (the section, unfortunately had passed through it), and I failed to pass a probe through the ductus arteriosus, yet, on the other hand, the ears were poorly developed and crumpled. And so on, and so on, instances might be given of this conjoined imperfect and extra perfect development of parts.

On the whole, however, the imperfectly developed parts are mostly those which are related to the special malformation which was here present—*i.e.*, the anencephalic monstrosity (cranial vault bones, ears). The rest of the skeleton shows very distinctly an advanced stage of ossification. The sternum, for instance, possessed five well-marked ossific nuclei (this is not shown in the plate, on account of the section being to the left of the middle line, but was evident on dissection); all the sacral vertebral bodies and one at least of the coccygeal were osseous; the ossific nucleus in the lower epiphysis of the femur was very large (it measured fully 7 mm. in diameter), and there was also an ossific centre in the head of the tibia; and the basis cranii was well ossified.

One or two other points in the anatomy of this postmature fœtus may be noted. The promontory of the sacrum was formed by the twenty-fourth vertebra instead of by the twenty-fifth. This character may perhaps be looked upon as a sign of defective development; Tridondani's researches on 'pelves of assimilation' (*Annali di Ostetricia*, xxiv. 1, 1902), at any rate, seem to point to this peculiarity in the formation of the promontory as a temporary one in the development. The umbilicus lay opposite to the junction of the third and fourth lumbar vertebræ. It is to be noted that this is its adult level; in the full-time fœtus it is usually one vertebral body lower (disc between fourth and fifth lumbar vertebræ). As has already been stated, the cervical structures were not situated so high as is usual in the fœtus (the hyoid bone lay opposite the third cervical vertebra, the epiglottis lay opposite the disc between the third and fourth cervical, the thyroid isthmus lay opposite the seventh cervical and the first dorsal vertebræ, etc.); but it cannot be claimed that this also is a sign of postmaturity, for, curiously enough, I found this low level of the cervical structures in a *premature* anencephalic fœtus some years ago (*Journal of Anatomy and Physiology*, xxvi. 516, 1892).

I was fortunate to be able to examine the placenta, membranes,

and umbilical cord of this postmature fœtus. I commenced to investigate their condition with a view to ascertaining whether they

FIG. 3.—MICROSCOPIC SECTION OF PLACENTA FROM CASE OF POST-MATURITY, SHOWING THE CONDITION OF THE VILLI.

FIG. 4.—ANOTHER SECTION OF THE SAME PLACENTA.

also showed signs of postmaturity; at the same time I could not formulate to myself what I expected these signs to be. The

placenta, as is well known, begins to show signs of age before the ninth month of intra-uterine life is reached; it is, in a word, senile

FIG. 5.—SECTION OF UMBILICAL CORD FROM THE SAME CASE, SHOWING GREAT THICKENING OF THE WALLS OF ONE OF THE ARTERIES.

FIG. 6.—SECTION OF THE SAME CORD, SHOWING CHANGES IN THE MUCOID TISSUE.

before the infant is born. In this respect it does not differ from the decidua vera and reflexa and the umbilical vesicle, etc. These

signs of senility ('physiological degeneration') have been described by Eden (*Journal of Pathology*, iv. 265, 1896) and others. Would the changes in a postmature placenta be an exaggeration of these? I found on examining a number of sections that the syncytial covering of the villi was uniformly and markedly thin (Fig. 3). It consisted entirely of a thin layer of plasmodium, and here and there the nuclei of it had run together. Further, there were many patches of fibrous tissue in the placenta, many more than are usually seen, and the vessels had thickened walls (Fig. 4). The decidual tissue, however, did not show degenerative changes to any extent. In the umbilical cord, however, the intima of one of the arteries was so greatly thickened as practically to obliterate the lumen (Fig. 5), while the other artery had also a thicker wall than is normal. The vein, likewise, showed thickening of its wall. Dr. Lovell Gulland kindly looked over some of my sections with me, and concurred with me in my description of them. He further pointed out an additional and interesting fact regarding the cord, the presence of distinct fibres in the mucoid tissue or jelly of Wharton (Fig. 6). This, I take it, must be a sign that even the mucoid tissue of this cord has passed on to a further stage in development than is met with at full term. These changes in the placenta are of such interest that I may possibly take them up at greater length in another article.

*Notes.*—This case calls for little comment. It is evidently of great importance both as an instance of prolonged retention of the living fœtus in the uterus, and also as an example of anencephalus. It is perhaps unfortunate that the two states were conjoined, as some of the anatomical and histological characters must be ascribed to the malformation, and not to the postmaturity; but to my mind it is not difficult to distinguish these into two groups according as they indicate defective development and excessive development. The placental changes and those in the umbilical cord cannot, I think, be in any way ascribed to the malformation of the cranium of the fœtus.

VI. Miss F.—J. F., an unmarried 1-para, nineteen years of age, was seen by me on January 4, 1902. She was under the care of two of my dispensary pupils, and they reported to me during the morning that her labour was making slow progress. I examined her, and found the os about the size of a crown-piece, the membranes bulging in a natural fashion, and the head (not well flexed) presenting. In the afternoon they reported again, and I saw her about 5 p.m. The membranes had ruptured (not much liquor

amnii), the anterior fontanelle could be easily felt, and the head seemed to be lying with the forehead to the back and right side. Abdominal examination showed that the fœtal head was large and lying above the brim; the sulcus between the occiput and the neck could be very plainly felt. The fœtal heart was audible. I put on forceps, but failed to bring down the head. After three attempts I came to the conclusion that it was not possible by this means to bring so large and well ossified a head through the pelvis. There was, it ought to be added, a slight degree of general contraction of the mother's pelvis, but no flattening. By this time the fœtus was moribund, so I perforated the head with the basilyst. Unfortunately, I could not reach the vertex or occiput of the head, and so had to make the opening rather far forward in the cranial vault. During the perforation I was struck by the great hardness and thickness of the vault bones, and even when I got the basilyst well through the bones they still resisted its lacerating effects very manifestly. After breaking up the head and washing out the contents, I again tried traction, but after several efforts (in which I was aided by the resident surgeons from the Royal Maternity Hospital), which proved futile, I determined to take the patient into the hospital. A large douche was given, and the vagina plugged with iodoform gauze. The patient was admitted to the Maternity at 7.30 p.m., and Professor Simpson (the senior physician in charge for the quarter) was summoned. He further diminished the size of the head, and attempted with the basilyst to break up the basis cranii also. This latter procedure proved very difficult on account of the position in which the head was lying, but it was ultimately accomplished; then partly with the basilyst tractor and partly with the cranioclast the head was brought on to the perineum, occiput to the front and left, forehead to the back and right. Now again there was delay, and the large shoulders stuck in the pelvis; it was found to be impossible to reach the axillæ. I suggested the performance of cleidotomy, and with Professor Simpson's approval I divided the infant's right clavicle. There was no difficulty in reaching the clavicle, but its advanced state of ossification made its division difficult.* The good effect of this unilateral cleidotomy was immediate, for the posterior axilla immediately came within reach, and the birth of the child was soon completed.

The vagina was frequently douched during the various manipula-

* This was the second occasion on which I had performed cleidotomy. The first time was for a flat pelvis, and the clavicle in this instance was very easily fractured (*Scott. Med. and Surg. Journ.*, viii. 48, 1901).

tions. A saline infusion was injected under each breast, as there had been a good deal of hæmorrhage, and the uterus and vagina were plugged with iodoform gauze after the uterus also had been douched out. Considering all the circumstances of the case, the patient made a good recovery; the highest temperature recorded was one of 100·6° F.; and she left the hospital on January 22.

The infant, without the brains and cranial vault bones, weighed nearly 8 pounds, and the placenta had a weight of 1 pound 12 ounces. The length of the child (without the cranial vault) was 21 inches. The ossification was everywhere well advanced, and the parts had a mature appearance. Unfortunately, the placenta was not secured for microscopical examination.

That this was a case of postmature labour I have no doubt. The patient, according to her dates, was five weeks past the full term, and the development of the infant was quite in keeping with the idea of postmaturity. It is noteworthy that the menstruation was of the thirty-day type. The patient was in good health during the whole period of her pregnancy. She felt quickening in July, 1901, and, as has been stated, the infant was born on January 4, 1902.

VII. Mrs. G.—The record of this case is imperfect, but I insert it because it illustrates the occurrence of antenatal desquamation of the cuticle in a postmature infant.

On November 23, 1898, I saw, in consultation with Dr. R. A. Lundie, an infant ten days old, which had been born with the epidermis peeling off. The child, a male, was the result of the fourteenth pregnancy of the mother, a perfectly healthy woman. Eight of the children, including the present one, had been boys, and six girls. All had been healthy at birth except the present, but two had died in infancy. The present pregnancy had been uneventful, and the mother stated that she had not been exposed to any infection, and had not known of any cases of scarlet fever or measles in the vicinity. She described the labour as dry, and was quite certain that she was ten days or a fortnight past her time. Dr. Lundie was not present at the moment the infant was born, but he arrived very shortly thereafter. The placenta and membranes did not strike him as in any way abnormal, and he noted that there was some vernix caseosa, but not much, on the skin. The desquamation of the cuticle was going on at birth. The child was torpid and did not cry. It was with difficulty that it was fed, for when the milk was put into the mouth it was almost always shot out again, unless the mother took care to pour it well back into the pharynx.

When the infant was a week old it was observed that the left parotid gland was somewhat enlarged; it still remained in the same torpid state. It was ten days old when I saw it, and the umbilical cord had not yet separated. The epidermis was still coming away in large flakes, and Dr. Lundie showed me quite a considerable piece which had separated from the sole of the foot. The stools were more highly coloured than usual at this age. The child died a few days later, but, unfortunately, no post-mortem examination was obtained.

These seven cases, representing ten postmature labours, illustrate several of the many ways in which postmaturity may manifest itself in connection with obstetric practice. I shall have occasion to refer to them again and again during the discussion of the general aspects of this problem of the postmature.

## Anatomy of the Postmature Infant.

In its anatomy the post-mature fœtus is a baby of one or two months old, with some fœtal peculiarities still in evidence. This is the key to the understanding of its structural characters. Its anatomical features have not yet been studied in sufficient detail and in a large enough number of cases to enable us to picture to ourselves the whole of its anatomy. There are several unworked or little-worked portions, such as the eyes, ears, skin, genital organs, etc., and until we know what are the postmature characters of these structures, we can only speculate upon many matters about which it would be most desirable to have full knowledge.

In *weight and size* the postmature fœtus is nearly always above the average. Excessive weight, unusual length, and large diameters are, in fact, the most reliable criteria of postmaturity; but they are not always present when there is other evidence of postmaturity, and they may be found when there is no evidence of postmaturity at all. The size and weight of the fœtus depend upon so many factors (size and age of the parents, state of fœtal nutrition in pregnancy, etc.) that it is not wise to decide the question of post-maturity from their evidence alone. At the same time, when taken in conjunction with other signs of over-ripeness, they have a considerable value, and their absence is sufficient to throw doubt upon the clinical history of any case of alleged postmaturity.

F. J. Taussig (*American Journ. Obstet.*, xliv. 516, 1901) has collected together sixty-one cases in which there was good evidence that gestation had lasted longer than 300 days; in all these the

weight was greater than 4,000 grm., and usually much greater. There was, however, one apparent exception, an anencephalic fœtus; it weighed only 3,762 grm. This exception was easily accounted for by the nature of the monstrosity—viz., absence of the cranial vault bones and brain. Of the ten illustrative cases reported by me, three were instances of anencephaly, and the weights of these three were: 3,270, 5,000, and 4,490 grm.; so that even when this monstrous condition is superadded to postmaturity the weight may still be much above the normal in some cases. In Taussig's list are to be found records of fœtuses weighing as much as 6,000, 6,355, 6,370, 7,000, and 7,470 grm.; of the five cited, one was a female. Many of the fœtuses measured more than 55 cm. in length, and three exceeded 60 cm. One reached the extraordinary length of 67·6 cm.

Remarkably large head diameters have also been reported by many observers in cases of postmaturity. I need not load this article with figures, and I simply refer the reader to the case of Mrs. B. for measurements of the head, and to that of Miss E. for those of other parts of the body (trunk, limbs).

The *skin and its appendages* may be expected to show peculiarities in postmaturity, and there is evidence of the following characters: There is absence of the lanugo, and apparently also, in some cases, of the vernix caseosa; desquamation is in full progress (Mrs. G.); there is no redness of the skin, such as is so characteristic of the premature infant, and the nails project well beyond the tips of the digits; there is a plentiful accumulation of subcutaneous adipose tissue, and the scalp is provided with a marked quantity of hair; the flexures at the various joints are deeper than usual.

*Ossification* is usually far advanced, and in one at least of my cases was exceedingly far advanced. This character is to be noted in practically all the bones of the body. It is very evident in the cranium, where the anterior fontanelle may be reduced to a very small space, the posterior fontanelle be obliterated altogether, and the sutures may be serrated in part at least.

It has been noted by M. Nuñez Rossié (*American Journ. Obstet.*, xix. 18, 1886) that the anterior fontanelle has lost its usual quadrangular shape, and become nearly triangular. The cranial bones are thick, and Rossié noted specially the compact consistence of the inner and outer tables. The whole cranium has, perhaps, a more quadrangular shape than usual, and its enlargement is more marked in the antero-posterior and transverse diameters than in the vertical ones.

In other bones the ossification is also far advanced. The sternum may show five centres (as in the case of Miss E.), and the whole vertebral column is markedly bony. The ossific nuclei in the lower epiphysis of the femur and in the upper end of the tibia are larger than usual; they may measure 6, 7, 8, and even 9, mm. in diameter. Further, ossific nuclei, which are not usually present at birth, or very feebly marked, may be found in these postmature infants. Instances are met with in the nuclei of the upper and lower epiphyses of the humerus, of the cuboid bone, and of the astragalus. The lower jaw also is well advanced in development, and, as I found when performing cleidotomy, the clavicle may be very osseous.

The *internal organs* exhibit their postmaturity in various ways. The structures which lie in the neck, for instance, instead of occupying the high position which they have in the fœtus, lie at a low level *quâ* the vertebral column; in fact, they have more nearly their adult relations in this respect. The liver, again, does not occupy so much space in the abdomen as it does in the mature or premature fœtus; it also has more nearly its infantile, if not its adult, relations. The lower part of the large intestine is more distended with meconium than is usual in the full-time fœtus, and the bladder may be found full of urine (Mrs. B). The heart has a foramen ovale nearly closed, and a ductus arteriosus, which may apparently be no longer patent. The convolutions and sulci of the brain are better marked than is common at birth. The whole muscular apparatus is further advanced in development. No doubt there are many other anatomical characters, both naked-eye and microscopic, which will be found to be present in the postmature fœtus; but further investigation on this point is urgently needed. It would be specially valuable if we could obtain careful post-mortem examinations of post-mature infants that survived birth for a few hours or days, and then succumbed to some malady not directly due to the post-maturity. In the meantime the characters described above seem to have been well established.

Apparently there have been very few examinations of the *placenta*, *membranes*, *liquor amnii* and *cord* in these postmature labours. In Taussig's list there are three references to the presence of calcareous materials on the surface of the placenta, and this may reasonably be regarded as a sign of maturity (Sfameni, *Annali di Ostetricia e Ginecologia*, xxi. 870, 1899). With regard to the size and weight of the placenta there seems to be sufficient evidence to show that both are increased. In the case of Miss F. the placenta weighed 1 pound 12 ounces, and in that of Miss E. 675 grm., or nearly 1 pound

8 ounces. At the same time, it is hardly to be expected that the placenta will be much above its normal full-time weight, for I have elsewhere shown ('Manual of Antenatal Pathology,' p. 93, 1902) that there is a marked slackening in the rate of increase of the placenta in the last two monhts of pregnancy. Probably another month spent in the uterus will not add much to the original weight of the after-birth. The histological appearances of the postmature placenta are interesting, but, unfortunately, the number of observations is very small. I do not know of any other than my own in Miss E.'s case, although, doubtless, a careful search through the literature of the subject might disclose others. The changes would seem to consist in the presence of a very thin syncytial layer, with signs of degeneration (fusing of the nuclei) over the villi, in the entire absence of Langhans' layer, in endarteritic changes in the vessels, and in the existence of a notable number of areas of fibrous degeneration. If, then, the most active and essential part of the placenta be the epithelium which covers the chorionic villi, there is reason to believe that the postmature organ is no longer of high physiological importance. This view is supported by the vascular changes in the umbilical cord (one artery almost closed), and by the conversion of some of its mucoid tissue into fibres. I cannot explain the absence of degenerative changes in the decidual part of the placenta, unless, indeed, it be that this want of degeneration was the cause of the longer stay of the fœtus *in utero*. The liquor amnii would appear to be small in amount in most cases of postmaturity, and in some it may have been nearly absent. In the three cases of anencephaly combined with postmaturity to which I have referred, it is noteworthy that in none of them was there excess of liquor amnii, although it is well known that hydramnios is very frequently associated with that type of monstrosity.

Such stated shortly are the facts, so far as they are known, of the anatomical peculiarities of the fœtus and the fœtal annexa that have remained too long in the uterus; such are apparently some of the results of a prolonged intra-uterine existence. Let us now examine the physiological aspect of the matter.

### Physiology of the Postmature Infant.

In dealing with the anatomy of the postmature infant, we were considering facts which had been demonstrated even if they are but little known; but when we approach the subject of the physiology of postmaturity we have to confess that we have to do almost

entirely with speculations. We do not, as a matter of fact, know what functions the fœtus is performing during these accessory or complemental weeks of antenatal life, nor how he is performing them. We can only make certain suggestions and advance certain hypotheses, whose probability will largely depend upon the correctness of the views we hold with regard to fœtal physiology in general.

It is to be expected that in the main the physiology of the postmature fœtus will be a continuation of the physiology of the mature fœtus. The placenta will continue to be the chief fœtal organ, the liquor amnii will continue to diminish in amount relatively to the size of the fœtus, there will be further signs of physiological independence on the part of the fœtal intracorporeal organs (*e.g.*, kidneys, liver, intestines), and the replacement of cartilage by bone in the skeleton will be proceeded with. But there will also be a difference. The physiology of the postmature fœtus will be something slightly (or perhaps markedly) different from that of the fœtus in the last trimester of pregnancy. The senile changes in the placenta will, by interfering with the special metabolism of that organ, call forth a greater amount of independent metabolism in the fœtus; for example, it will act less perfectly as an excretory organ, and so urine will accumulate in the fœtal bladder. Through the absence or diminished quantity of the liquor amnii the desquamation of the epidermis which usually commences after birth will have already begun. On account of the tendency to close shown by the foramen ovale and ductus arteriosus, there will be changes in the circulation which may lead to the awakening of certain organs to physiological activity, and which may thereby endanger intra-uterine life. In this relation, it is a curious fact that F. A. Stahl (*American Journ. Obstet.*, xxxi. 842, 1895), in describing a case of postmature labour, states that *vagitus uterinus* was heard distinctly several times during the operation of version. The fœtal heart-rate also may slacken. The meconium will probably be forced downward in the bowel by active peristalsis till it lie wholly in its lowest part, and may even be expelled before birth into the uterine cavity. There will then be a subtle change in the physiology of the fœtus due to the engrafting upon it of some phenomena which are characteristic of neonatal rather than of antenatal life. I might expand these speculations, but I forbear, because, after all, they are largely hypothetical. At the same time I need hardly point out how important it would be if we could obtain reliable data regarding the histological characters of the blood in the postmature infant, the chemistry of his urine, the state of his

reflexes and of his nervous activities in general, and the character of his placental interchanges. All these are matters which may be yet investigated, and with much profit. It would be very interesting to know, for instance, the chemical composition of the placenta and fœtal tissues in a case of postmature labour, the amount of iron in the fœtal blood and liver, and the percentage of lime, potash, and soda salts in all the parts.

### Pathology of the Postmature Infant.

The chief peculiarity about the pathology of the fœtus which has remained too long in the uterus is the predominance of traumatic morbid states. It has to pass, like any other infant, through the mother's pelvis, and during its transmission it is subject to injuries of various kinds. The larger and the better developed the infant is, the more will it suffer. These intranatal injuries must of necessity mask to a large extent any other peculiarities in the pathology of the postmature infant, and allowance must be made for them, because it is not possible to hope for many opportunities of examining postmature fœtuses which have been removed by Cæsarean section and so been spared the great traumatism of birth. Let us consider first, then, the morbid changes due to intranatal pressure and obstetric interference.

Fractures are common, and are found more particularly in the region of the head. In the case of Mrs. B., for instance, both the frontal and occipital bones were broken. The advanced state of ossification of the cranium predisposes to these solutions of continuity, for displacement of the bones one upon the other and head moulding cannot occur. Another region of the body in which injuries are common is that of the shoulder girdle, for next to the head the shoulders find the greatest difficulty in passing through the mother's pelvis.

Hæmorrhages also are common in postmature infants. H. R. Spencer's monograph on 'Visceral Hæmorrhages in Still-born Children'* is a classic, and gives information of the greatest value relating to these lesions, but, unfortunately, there are no details as to the mature or postmature character of the labours, save the indirect evidence afforded by the weight of the infants. It will probably be found, when numbers of cases of postmaturity have been studied, that the cerebral, hepatic, renal, adrenal, pulmonary, and splenic

* *Trans. Obstet. Soc. Lond.*, xxxiii. 203, 1892.

hæmorrhages described by Spencer are specially common in them. In Mrs. B.'s case the intracranial hæmorrhages were very extensive; they are well seen in Fig. 1.

In addition to these injuries which result solely from the pressure brought to bear upon the head and other parts of the fœtus by the bones of the mother's pelvis, there are the lesions inflicted by the obstetrician in his efforts to aid labour. There may be skin abrasions and muscular ruptures, fractures of the cranial vault, and injuries of the deep-seated organs from prolonged traction (and compression) by the forceps or blunt hook, not to speak of the actual lacerations and disruptions caused by the operations of craniotomy, basilysis, cranioclasm, cleidotomy, and the like.

Even when the postmature infant escapes an intranatal death, his future health may be seriously interfered with by the results of the traumatism through which he has passed; his later pathological developments will take on a special character therefrom. The obstetrical paralyses, for instance, may be the price that he has to pay for his postmaturity, and other little-understood congenital disabilities may be due to the same cause.

In addition to these morbid states which are directly or indirectly due to the difficulty which an over-ripe fœtus finds in passing through the mother's pelvis, there are others which cannot be thus explained. Just as the anatomy and physiology of the postmature fœtus exhibit peculiarities, so his pathology will be exceptional, and its exceptional character will be in some measure dependent upon these anatomical and physiological deviations. The changes in the structure and functions of the heart and kidneys and placenta and brain can hardly fail to influence the development and manifestations of diseases affecting these organs. Possibly future observations will show that postmature infants are less liable to jaundice of the new-born, to hæmorrhage from the umbilicus, to septic infection, to chilling, etc., than mature or premature children. Our knowledge on this matter is certainly not sufficient to warrant dogmatic assertion.

Finally, it would seem that in the pathology of the postmature fœtus teratological states occur with greater frequency than in that of ordinary infants. This appears to be specially true of anencephalus. Out of the ten cases of postmaturity recorded above, three were anencephalic fœtuses; in Taussig's list of sixty-one cases, three also were anencephalous; and Maidlow has recently reported another (*Lancet*, p. 990, October 11, 1902). Obviously this percentage of anencephaly is far above that met with when all labours (pre-

mature as well as mature) are included. The discussion of the cause of this association of anencephaly and postmaturity leads me to that of the causation of postmaturity itself.

### Pathogenesis of Postmaturity.

The causation of postmature labour is one of the many mysteries which are met with by the student of antenatal physiology and pathology. To clear away the mystery it would be needful to know the cause or causes of the supervention of labour on or about the 276th day after impregnation. This knowledge, notwithstanding much investigation and too much speculation, we do not yet possess. Neither simple periodicity, nor distension of the uterus, nor heredity, nor the 'unconscious memory of the tissues,' will explain it satisfactorily; and, of course, the 'maturity of the ovum,' so much spoken of in a hopeful way as *the* explanation, can scarcely be the cause, else why do postmature labours with postmature fœtuses occur? Some of the causes of premature labour are known, such as rupture of the membranes, dilatation of the cervix, hæmorrhage into the placenta, and the use of oxytocic drugs; but these do not help us much in our explanation of postmature labour, unless, indeed, we simply affirm that its causes are the negations of the above.

Causes have been suggested, and in no small number, but none of them can be called sufficient. Multiparity, for instance, has been affirmed, but three out of my seven patients were primiparæ. The advanced age of the mother has been referred to, and it is true that both my first patient and her husband were elderly; but this was not a noteworthy fact in the other cases. Heredity has been mentioned, as has rest in pregnancy. The type of menstruation has been stated as having an influence upon the length of utero-gestation, and it has been supposed that the thirty-day type would mean a prolonged pregnancy; but the menstrual type would appear to have been rarely other than twenty-eight day. The postmature infant is possibly more often a male than a female, but in my series of cases there were nearly as many females as males. The frequency of anencephaly suggests that in this malformation may lie at least one possible cause of postmaturity, and perhaps the absence of the rounded cranial vault at the brim of the mother's pelvis may in some way lead to non-excitation of some reflex mechanism which normally initiates uterine contraction. It must, however, be confessed that we are really in the dark as to the pathogenesis of postmaturity. Perhaps the secret lies in the placenta, perhaps in the

maternal nervous system, perhaps in the fœtal metabolism. Who can tell? With some hesitation I suggest that the causation is not single, but multiple, and that the occurrence of delay in the onset of labour pains is due to a defect in the orderly incidence of exciting and determining factors which normally excite them. Whether the chlorate of potash given in Mrs. A.'s case tended to prolong the pregnancy is not a very important question, for in most postmature labours no such medicine has been taken, and in the first and fourth of Mrs. A.'s postmature pregnancies it was not administered.

The meaning of postmaturity is not so difficult to estimate as its pathogenesis. It is not, I think, to be regarded as a mark of high procreative power, or as a sign that the reproductive organs are performing their functions better than usual; it is rather to be looked on as a sign of defective physiology, as an indication of the abnormal in character as well as in time. The fœtus, although large, is not necessarily equally and evenly well developed, as is shown by the occurrence of anencephaly, non-descent of the testicles, etc.; there is often that curious combination of advanced and retarded development to which I have referred. Its association with advanced age of the parents and with the previous history of *premature* births are facts which point toward the conclusion that postmaturity is eminently pathological. Certainly it leads to very morbid types of labour. It is an interesting, although not perhaps an important, fact that the mother in Paget Blake's* case was one of triplets, and that in Maidlow's case the parents were first cousins.

It would be of great interest if the after-history of such postmature infants as survive their birth could be obtained.

## Symptomatology of Postmaturity.

It does not appear that the pregnancy of the woman who goes beyond the full term is specially disturbed by dangerous, or even by unpleasant, symptoms. Perhaps there is, as has been stated by W. F. Sprenkel,† a greater risk of renal inadequacy and resulting eclampsia in these cases; perhaps, also, sickness may be more troublesome and fœtal movements more disturbing; but as a general rule the gestation period passes by in comparative peace and comfort, and so contrasts all the more markedly with the stormy scenes and pressing dangers associated with the postmature labour. No doubt the prolonged residence of the fœtus *in utero* produces an

* C. Paget Blake, *Trans. Edinb. Obstet. Soc.*, xviii. 246, 1893.
† W. F. Sprenkel, *American Journ. Obstet.*, xxxiv. 846, 1896.

effect upon the maternal system, and it would be exceedingly interesting to know just what changes are brought about in the physiology of the mother under such circumstances; but in the absence of knowledge on this point it would be a mistake to speculate. It will be well if future workers in this field of research will make careful analyses of the urine, microscopical examinations of the blood, and investigations of the nervous system (reflexes, sensibility, etc.) of all women who have passed the full term of pregnancy.

Apparently, it is not uncommon for a sort of 'missed labour' to occur about the calculated full term of utero-gestation. Some uterine pains may occur, and the patient may feel sure that her confinement is imminent, and then these may die away and nothing further occur till some weeks later. 'Missed labour,' however, is not a constant occurrence in these cases, and sometimes there is no evidence of uterine contractions till the postmature delivery itself supervenes. At the same time, as soon as the estimated full time is passed, the patient can hardly be described as in a satisfactory state; she is annoyed, vexed, and irritated by the unexpected delay which has thrown all her arrangements out of order; she is to some extent alarmed by the possible consequences which may be looked for when labour does supervene, and her nervous system may, so to say, get the better of her and lead to unpleasant, and even alarming, phenomena. It need hardly be added that the nurse and doctor who have been engaged for the confinement will find it a hard task to be uniformly cheerful and helpful to the patient as week after week passes by with no sign of the arrival of the expected infant. The question whether the medical man under these circumstances ought simply to wait will be considered immediately.

When, ultimately, labour pains do come on, the comparative peace of the pregnancy soon gives way to all the turmoil and anxiety of a tedious, and often instrumental, labour. The medical man also is apt to be taken unawares. He may have carefully measured the mother's pelvis and found it to be normal, and he may have explained the postmaturity away by the thought (expressed or unexpressed in words) that the patient had 'made a mistake in her dates'; so he may come to the confinement little prepared to interfere with forceps, and dreaming not at all of being called upon to perform any of the major operations of obstetrics. He is soon undeceived. He finds the head lying above the pelvic brim, most often badly flexed, and with the anterior* fontanelle or the face presenting; but he does

* The anterior fontanelle, on account of its small size and unusual shape, may be mistaken for the posterior one.

not yet, perhaps, recognise that there is going to be difficulty. He waits, but the head does not engage; he again measures the diagonal conjugate and explores the pelvis, but finds there no cause of delay; he perhaps discovers that the posterior fontanelle is not within reach, and that the bones of the head are well ossified. He then applies forceps, not yet anticipating any great difficulty, or perchance he turns or tries to turn. There is very little liquor amnii, and he finds neither operation easy. If he has chosen forceps, he experiences difficulty with the application, and more difficulty with the locking of the instrument. He at length, however, gets a grasp, and he pulls, at first gently and then more powerfully, and finally very powerfully. If he is a thoughtful man, he will soon realize that with such a grasp of the head and such an amount of force he is really performing, not a forceps operation, but embryulcia; it will be plain to him that he is really crushing the infant's head, and he may have his suspicions made certainties by feeling that one or several fractures have occurred. On listening over the abdomen with the stethoscope, he hears either a very slow and feeble fœtal heart or none at all. The results of the auscultation determine his further conduct; he puts the ideas of Cæsarean section or symphysiotomy away from him (if he had, indeed, entertained them at all) and proceeds with the perforator or the basilyst to break up the head and extract the child. Even with the help of these operations he may find it difficult to complete the labour; the passage of the shoulders, for instance, may give much trouble. The finer details in his aseptic or antiseptic practice will by this time have been all abandoned; and he will be glad to get the labour over almost on any terms. He will yet, however, have to face the risks of the third stage and post-partum hæmorrhage, and in the future he sees the danger of sepsis looming gloomily. He will require to stitch up a deep laceration of the perineum, and perhaps have to pack the uterus and cervix for lacerations there. And, finally, he has the difficult task of explaining to the husband of his patient how it has come about that so much interference has been necessary, and that the net result is a dead infant, and a mother whose condition may for some days yet be considered as critical.

This is one clinical picture—perhaps the commonest—but it need hardly be added that there may be many variants of it. All kinds of obstetric interference may be called for, from minor manipulations up to the performance of Cæsarean section; all degrees of gravity of prognosis to mother and infant may be met with; and all sorts of emergencies and difficulties may arise. Enough has, however, been said to give the reader a notion of the symptomatology and general

clinical features of a postmature labour, and to emphasize the importance of this problem of postmaturity.

### Management of Postmaturity.

As with the premature, so with the postmature labour: the ideal plan of procedure is *prevention*. Unless it can be shown that the infant benefits in any way from a prolonged residence in the uterus, the logical plan will be to cut short its stay, for assuredly there is no advantage accruing to the mother from such an anomaly. Possibly, cases may occur in which the infant that has lived a month longer in the uterus shows only a state of maturity, and not one of post-maturity. In such instances it may be claimed that the additional month was needed to bring the retarded development of the fœtus up to the normal. These cases, however, must be rare, for it is shown by Taussig's tables that prolonged pregnancy and increased fœtal weight are very frequently, if not always, associated. Again, the micro-scopic examination of the placenta in Miss E.'s case gave evidence of changes in that organ of a type not likely to help a fœtus to a marked state of development. From the point of view of placental activity, there seems no reason to suppose that an additional month spent *in utero* is of service to the fœtus.

It may be regarded as probable, therefore, that the infant gains no advantage from its postmaturity. We know, as a matter of experience, that it is of the greatest disadvantage to it during the process of birth, and may even be the cause of its death. The pre-vention of postmaturity, therefore, is to be attempted.

There are several different directions along which preventive measures may be projected.

In the first place, there might be prevention of the tendency towards postmaturity. Alas, however, we do not know the cause or causes of the uterine inactivity, and so we are unable to prevent their influence coming into play. If we knew that the prolongation of pregnancy was due to the advanced age of the parents, to their consanguinity, to maternal emotions, or to any drug or mode of life, we could see some hope of success for this line of treatment in the future; but at present there is no indication of this.

In the second place, there might be prevention of postmaturity in cases in which this anomaly has occurred in a previous pregnancy. It does not seem very likely that anyone will be so bold as to suggest the induction of labour in a primipara who has gone two or three weeks beyond the estimated date of her confinement. Under these

circumstances the medical man is justified in thinking that probably there has been an error in the calculation of the length of the pregnancy, and he will be wise to await events. At the same time, he will do well to test the urine frequently for albumen, and to examine the abdomen of the mother now and again to discover the lie of the fœtus, the depressibility of its head into the pelvic brim, and its flexed or extended condition. Measurements by means of the cephalometer (Budin's or Perret's), although possibly difficult to obtain, would be of great service in enabling the medical attendant to estimate whether the fœtus is postmature or not. It need not be added that the rate and character of the fœtal heart-beats should be watched. It is quite possible that the results of these investigations might justify us in bringing on labour even in a primipara.

Whatever may be the view we take of our duty in regard to the primipara who has gone undelivered beyond the full term, there can be little doubt as to the line of conduct to be followed when a woman who has once had a postmature labour of a dangerous kind shows signs of repeating the experience. Under such circumstances there seems no reason why a dose of castor-oil might not be given about the estimated date of delivery, and followed up with 10 grains of quinine the next morning, as recommended by Barton Cooke Hirst ('Text-Book of Obstetrics,' 2nd edit., p. 288, 1900). Consultation with another medical man is, however, a useful preliminary to these and to the more active and instrumental attempts to bring on labour.

If it were deemed inadvisable to induce labour in any case in which the full term is past, the resources of preventive obstetric medicine are not exhausted. There is still the possibility of checking the growth of the fœtus by altering the diet of the mother. It is true that we know little about the influences which regulate fœtal growth and ossification, but of late years Prochownick (*Centralbl. f. Gynäk.*, xiii. 577, 1889; *Therap. Monatsch.*, xv., Hft. 8, 9, 1901) and others have boldly attacked the problem, and have accumulated evidence which proves, as clearly as purely clinical evidence can prove, that a certain diet tends to produce small infants with comparatively soft heads. I have elsewhere ('Manual of Antental Pathology,' p. 473) considered this matter pretty fully, and I need not write more upon it here. The diet recommended by Prochownick is one which contains very little fluid (not more than 500 c.c. in the day), and no soups, potatoes, puddings, sugar, and beer. By this method of feeding, while it could not be hoped that the postmature pregnancy could be brought to an end, it might, at least, be expected that the infant's size and development would not be so

large, and that in consequence its transition through the pelvis would not be so traumatic.

In the next place, there is the actual *management of a postmature labour in progress*. The time for prevention has gone by, or the obstetrician has been summoned only after labour has been in progress for some time. The first step in the treatment now is an early recognition of the state of affairs, and a clear conception of the dangers that it carries with it. The obstetrician must realize that he is actually face to face with the same sort of difficulties and dangers as are met with in a case of labour in a contracted pelvis. It is as difficult for a large head to get through a normal pelvis as it is for a normal-sized head to get through a small pelvis; and if the large head be also a strongly ossified one, it may be more difficult. When, therefore, the medical man is called to a case which has gone a fortnight, or a month, or more, past the full term, he ought to try to ascertain the size and degree of ossification of the head and its relation to the mother's pelvis. He ought first to make careful measurements of the diagonal and external conjugate diameters as well as of the interspinous and intercristal, and so deduce the length of the conjugata vera and of the transverse at the brim (*vide* Sandstein's article in this JOURNAL, p. 356, October, 1902), so as to exclude a pelvic contraction. Of course, maternal pelvic deformity and a postmature labour may be met with in the same patient; all the difficulties are then increased and the danger intensified. Having found that the mother's pelvis is normal, the obstetrician ought next to try to measure the occipito-frontal diameter of the fœtal head through the abdominal walls with the cephalometer in the manner described by Perret (*l'Obstétrique*, iv. 542, 1899); this will give him an idea of the size of the head. Then he ought to note how the head is lying, whether the occiput and the groove of the neck are easily palpable (indicating extension) or not, and whether or not he can depress the head into the brim of the pelvis. From this examination he will be better able to forecast the probable progress of events, and it is of the greatest importance in these cases to recognise early what amount and what kind of obstetric interference will be required. The vaginal examination, after the os has dilated, may aid in making clear the position of the head and its degree of flexion or extension. It ought to be borne in mind that in a well-ossified head the anterior fontanelle may not greatly differ in its characters from the posterior fontanelle of a poorly-ossified one.

The further management of the case will depend largely upon the results of these examinations. It may be judged that it is pos-

sible for the head to pass through by means of the natural efforts alone or with the help of the forceps, and, of course, such cases are not uncommon. The obstetrician then simply waits events, or applies forceps in the second stage. There may be a delay which is due solely to the oligohydramnion; this may be counteracted in part by vaginal douching. But there may be cases, however, in which the application of forceps is not sufficient easily to complete the confinement; these are the instances which the obstetrician requires most carefully to watch for. Too often the attempts with forceps are persisted in till the operation becomes really one of head-crushing, and the result is a still-born child; or recourse has to be had to actual head perforation.

What, then, is the obstetrician to do when he finds that he cannot extract a living and postmature child through the mother's pelvis? Is he to do symphysiotomy, or Cæsarean section, or craniotomy? What he does will probably depend in part upon the view he takes regarding the justifiability of craniotomy in any case; it will also depend upon the state of the infant (whether it be alive, dead, or in danger of dying, as ascertained by the state of the fœtal heart-beats). In the great majority of cases, however, he will still decide in favour of craniotomy; but it is quite likely that in five or ten years the operation of choice will be Cæsarean section. Here we are dealing, not with a premature, but with a postmature infant—with, in other words, a thoroughly viable infant, and one which ought to live if it were once safely extracted from the mother's uterus. It is not likely to succumb after birth, so far as is known, unless it has been injured in the birth. Congenital debility is hardly to be feared. There is, therefore, much to be said in favour of Cæsarean section in these cases; only if it is to have a fair chance of success it ought to be performed early in labour, and not after repeated futile attempts have been made with forceps. Herein lies another reason for the early recognition of the existence of disproportion between the fœtal head and the maternal pelvis. There is, of course, the risk that the infant may be anencephalic; but this can hardly seriously alter the state of affairs, for it will probably be recognisable by the end of the first stage of labour, and before Cæsarean section is embarked upon. If craniotomy is, after all, the operation chosen, it ought to be borne in mind that it will probably be necessary to do cleidotomy and episiotomy in addition, for there is sometimes as great difficulty with the passage of the shoulders as with that of the head, and the perineum almost always tears, and tears deeply. It is unnecessary, perhaps, to emphasize the need for

surgical cleanliness in the conduct of these cases, although they are just the cases in which it breaks down, and in which there is maternal morbidity, if not actual mortality, therefrom in the puerperium.

The management of the postmature infant that survives his birth cannot be said to be well understood. Obviously the incubator and the wet-nurse that are called for in the case of the premature baby are not needed here. Enough is not known of the physiology of this kind of neonatal life to enable us to lay down rules for the diet and hygiene of the postmature infant. He may be less susceptible to sepsis, his cord may take longer to fall off, etc., but actual knowledge of facts is small. The supervention of œdema neonatorum in one of my cases (Mrs. A.'s second labour) may have been a coincidence. About one thing, however, we can be quite sure. The chief treatment the infant will require should be directed towards the undoing of the evil effects of birth traumatism (cranial fractures, hæmorrhages, lacerations of muscles, etc.); unfortunately, our resources in this direction are not great.

From what has been said, it will be apparent to the reader that the problem of postmaturity has many aspects—some scientific, others unscientific, some theoretical, others intensely practical: all of them, however, have this in common, that they appeal to the obstetrician for solution. If not much has been accomplished in this paper towards the solution of any one of them, it can at least be claimed that they have been fairly stated, and perhaps brought thus more prominently before the notice of those who may be able to solve them.

# ON REPEATED CÆSAREAN SECTION.

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On April 6, 1901, I performed the first Cæsarean section on Mrs. J. J., aged 27, who was in labour with her first child. She was a feeble, anæmic person, with a cachectic appearance due to syphilis. When five years of age she had suffered from hip-joint disease, which had occasioned marked pelvic deformity. The pelvic measurements were as follows:

| | Inches. | | Inches. |
|---|---|---|---|
| Interspinous ... ... | 7 | Conjugata vera ... | 2 to $2\frac{1}{2}$ |
| Intercristal ... ... | 8 | Transverse of outlet | 2 |
| Ext. conjugate ... ... | 6 | Antero-posterior of outlet ... ... | 4 |
| Post. Sp. Il. ... ... | $2\frac{3}{4}$ | | |

The operation was carried out in the usual manner, without administration of ergot, eventration of the uterus, or compression of the broad ligaments. The anteriorly lying placenta gave no trouble, but after it had been removed, together with the membranes, the interior of the uterus was found to be lined by a layer of greenish-yellow, pulpaceous material. This was extremely tenacious, and was only stripped off with difficulty. The uterine wound was closed with deep, interrupted, chromicized catgut sutures, followed by two layers of continuous catgut sutures that included peritoneum only. The parietal wound was sutured with silkworm-gut.

At the end of a month the mother and child were discharged from hospital. The uterus lay in the pelvis, and was apparently quite movable.

Pregnancy supervened again in July, and the patient was at once placed upon anti-syphilitic treatment, from which she derived great benefit throughout the whole period of gestation. Labour set in on the morning of April 16, 1902, and the patient entered the Lying-in Hospital some hours later. On examination the abdominal scar was perfectly sound; the fœtus lay with its back turned to the mother's right, and the transversely lying head was above the brim of the pelvis. The cervix admitted one finger; membranes unruptured. Labour pains were strong and the cervix dilated to a

considerable extent, and the membranes gave way before the operation took place.

Assisted by my colleague, Dr. A. Stookes, I performed the second section, making the incision along the centre of the abdominal scar, which was composed of tough cicatricial tissue $\frac{3}{4}$ inch in thickness, and showed no sign of yielding.

Presently the surface of the uterus appeared, covered with normal peritoneum, over which the parietes glided with every respiration. The introduction of the right hand into the abdominal cavity confirmed the suspicion that adhesions were quite absent, and ascertained that the placental site was on the posterior wall of the uterus. On the anterior wall the position of the first incision was indicated by a faint linear depression. There was no thinning, and not even any appearance of cicatricial tissue when the incision was made through the 15 mm. thick wall. The child was extracted without difficulty, and the posteriorly attached placenta and the membranes removed. Interrupted catgut sutures were used to close the uterine wound, and the latter was then attached to the lower part of the abdominal incision by seven catgut sutures and two of silk tied tightly in order to relieve any strain on the catgut. These sutures passed through the entire thickness of the abdominal parietes of each side, and entered and emerged from the uterine wall at a distance of $\frac{1}{2}$ inch from the line of the uterine incision, whilst their loops were sunk about $\frac{1}{3}$ inch in the uterine parietes. When they were tied they not only approximated the edges of the abdominal wound, but they fixed firmly to the parietes an area of the uterine wall measuring about $3\frac{1}{2}$ inches by 1 inch. The procedure was, in short, an extensive ventro-fixation. The extreme upper and lower sutures were passed about 1 cm. beyond the extremities of the incision, in order that a repetition of the incision at a future section should not by any chance run the risk of entering the peritoneal cavity at the upper or lower limits of the utero-parietal adhesion. The remainder of the parietal wound was sutured in three layers.

There was no compression of the broad ligaments, and very little handling of the uterus, with the result that bleeding was trifling. Recovery was easy and uninterrupted. The female child was apnœic when delivered, and did not attempt to breathe for three minutes. Its weight at birth was 6 lb. 3 ozs., and it is now a strong healthy infant.

The absence of adhesions was a matter of disappointment to me, since perusal of the experiences of W. J. Sinclair, H. R. Spencer,

A. H. F. Biggar, C. Everke, and others had led to the expectation of a more or less complete utero-parietal attachment. If, as Paul Bar declares, its absence is to be regarded as an indication of the triumph of asepsis, then the success is a matter of congratulation only when viewed from the scientific standpoint, since the condition implies for the patient an exact repetition of the risks attendant upon the first operation. But, disregarding for the time the question of the causation of adhesions, it cannot be gainsaid that their complete development under modern methods immeasurably improves the chances of success at subsequent sections. Examples of this, recently reported in England by Sinclair and Spencer, have aroused anticipations that are not altogether justified by a study of the experiences of others; for, unfortunately, in the majority of cases there are present conditions intermediate between total adhesion and total absence of it, and included in this category are instances more or less tragic in their consequences.

Few repetitions of an operation, itself infrequent, fall to the lot of any one surgeon, hence individual opinions on the subject are apt to be based on a limited number of cases. Herein lies the explanation of the diversity of opinion prevalent in Great Britain at the present time.

In July, 1900, the London Obstetrical Society[1] had under consideration the subject of Cæsarean hysterectomy for fibro-myomata, and the discussion strayed, as happens occasionally, from the limits of the subject proper into more general paths. Several members assumed an attitude of hostility towards the conservative operation in cases of permanent pelvic obstruction. Wm. Duncan stated that 'abdominal hysterectomy with intraperitoneal treatment of the stump was much less dangerous than any Cæsarean section, and he would adopt it in all cases which necessitated removal of the fœtus per abdomen, the only exception being in favour of cancer of the cervix, in which he thought it safer to clamp the cervix and fix it in the lower end of the abdominal incision.' J. H. Targett considered 'that a non-sterilizing Cæsarean section was very rarely justifiable; while between a supravaginal hysterectomy and a Cæsarean section with sterilization the balance would usually be in favour of hysterectomy, because it could be more rapidly performed and prevented the risks of hæmorrhage and sepsis.'

P. Horrocks preferred sterilization by snipping half an inch out of the middle of each Fallopian tube. H. R. Spencer opposed Cæsarean hysterectomy in cases of permanent pelvic obstruction, and would have nothing to do with sterilization by tying or cutting the tubes,

as he considered the conservative section the proper operation in such circumstances.

In 1901, at a meeting of the North of England Obstetrical Society in Liverpool, W. J. Sinclair[2] stated that he was opposed to tying or removing the tubes with a view to sterilizing the patient, and expressed himself in favour of the conservative operation. This opinion received almost unanimous endorsement at a subsequent meeting of the same society early in the present year.[3]

Murdoch Cameron,[4] at the meeting of the British Medical Association in Manchester, entered a protest against 'the appalling frequency of hysterectomy along with Cæsarean section, as advocated by some members of the London Obstetrical Society,' and stated that his usual practice was to tie and divide the tubes in order to produce sterility. At the same discussion A. L. Galabin[4] said, 'I would urge that the time is ripe for further extension of Cæsarean section in the treatment of pelvic obstruction'; and again, 'The results now obtained justify the advice that sterilization be not carried out, except in such cases as obstruction by fibroid tumour or cancer.'

Thus, there are three different views as to the procedure to be followed:

1. Cæsarean hysterectomy—W. Duncan, J. H. Targett.

2. Cæsarean section, with resection of portions of both Fallopian tubes—P. Horrocks, Murdoch Cameron.

3. Cæsarean section without sterilization—W. J. Sinclair, H. R. Spencer, A. L. Galabin, N. Raw.

The comparative paucity of cases of the repeated operation led earlier writers to assume that diminished fertility was one of the results of the first section, an opinion supported by a case of Korn's,[5] in which the decidua was absent over the site of the scar. Recently Franz Torggler[6] has shown that there is no real ground for the supposition, and a study of the cases has led me to the same conclusion.

Of the cases that occur scattered throughout Obstetrical literature, some are reported too briefly to warrant their inclusion in this paper. (A list of these will be found on page 605.) In making an examination of those available, it has to be borne in mind at the outset that they divide themselves naturally into two classes:

1. Examples of the so-called 'old method,' in which the operators 'confided the closure of the uterus to nature.'

2. Cases in which the uterine wound was sutured.

Division of these two groups by a time limit would occasion

difficulties, and might incur the charge of sciolism. Since the first recorded instance of the application of uterine sutures by Lebas[7] in 1769, the procedure had been repeated in isolated cases until the work of Kehrer and Sänger revolutionized its technique. These two surgeons published the results of their independent labours in 1882, and from that time onwards suture of the uterus became the rule. Only those cases will be considered in the reports of which occurs the definite statement of suture by modern methods.*

Study of these cases reveals the existence in the majority of intraperitoneal adhesions of varying extent; in a minority they are entirely lacking. The cases may be classified under the following heads:

I. Cases in which there is complete adhesion of the uterus to the peritoneum of the anterior abdominal wall; complete utero-parietal adhesion.

II. Cases in which the uterus has contracted adhesions with—

(*a*) The anterior parietal peritoneum to a varying degree; incomplete utero-parietal adhesion.

(*b*) *In addition*, one or more of the abdominal viscera, usually intestine or omentum, or both; utero-visceral adhesion, subdivided into utero-intestinal and utero-omental. *At least one of these forms invariably accompanies incomplete utero-parietal adhesion.*

III. Cases in which utero-visceral or parieto-visceral adhesions alone exist.

IV. Cases of slight filamentous utero-parietal adhesion.

V. Cases in which adhesions of every kind are entirely wanting.

## I. Complete Utero-parietal Adhesion (see Table A).

Out of a total of 8 cases, in only 3 was the utero-parietal adhesion sufficiently extensive to allow of the repeated operation being absolutely extraperitoneal. In 5 others the adhesion was defective over a small area, so that the operations cannot strictly be described as extraperitoneal.

### *Cases in the First Category.*

1. A. H. F. Biggar found at the second operation, some six years after the first, that 'the whole length of the uterus' was entirely adherent to the abdominal wall, and that, in consequence,

* Case 25 is an exception. It is very imperfectly reported, but the condition found at the second section is so strongly in favour of the use of uterine sutures at the first that I have felt justified in including the case.

the premeditated design of sterilizing the patient could not be executed.

2. R. Olshausen, operating for the second time after an interval of seventeen months, found some thin adhesions between uterus and abdominal wall, and also between uterus, omentum, and abdominal parietes. The uterus showed no trace of the first incision. The adhesions were separated so as to allow of the eventration of the uterus. When the patient left hospital the uterus was adherent to the abdominal wall. Four years later the third operation took place, and this time the utero-parietal adhesion was complete, the whole anterior surface of the uterus being involved. This opportunity for the performance of the extra-peritoneal operation was ignored, the adhesions were separated, and the uterus eventrated. With manual compression of the broad ligaments a median fundal incision was made, and after delivery had been effected atony and post-partum hæmorrhage occurred.

3. W. J. Sinclair, five years after the first section, operated for the second time on a patient in whom there were evidences of utero-parietal adhesion. This was confirmed at the operation, for, 'on cutting through the cicatrix, the incision was found to extend at once into the muscular wall of the uterus, so that the uterine cavity was entered without opening the peritoneal cavity.' Unfortunately, when the sutures were being introduced, 'anæsthetic vomiting took place, and caused a slight tearing upwards of the wound, so that it extended a short distance into the peritoneal cavity. This was closed.' The condition necessary for the extra-peritoneal operation was present, and but for an accident beyond the control of the operator the peritoneal cavity would have remained intact, so the case is grouped with those of Biggar and Olshausen. It is to be noted that the tear occurred at the upper end of the wound, the place where utero-parietal adhesion seems apt to be defective.

Post-partum hæmorrhage occurred only in Case 2, after an operation involving considerable handling of the uterus and compression of the broad ligaments.

In two cases (Nos. 1 and 3) adhesion followed the first operation, and in one of these (Dr. Sinclair's) it was intentionally brought about by padding the abdominal wall after the operation. In Case 2 complete adhesion only resulted after the second interference, and although an extraperitoneal operation was then possible, the opportunity was not taken advantage of.

*The Second Category.*

This includes cases in which utero-parietal adhesion was all but complete.

4. The first operation took place in 1886, and Korn performed the second in 1887, when the cicatrix of the pendulous abdominal wall was so thinned that the silver sutures used at the first operation could be easily palpated. The incision was placed to the right of the scar. To the whole length of the latter the uterus was adherent, and in its thinned wall four silver sutures were visible. After separation of adhesions the uterus was eventrated. The detachment of the anteriorly situated placenta was effected with difficulty. Catgut was the suture material employed on this occasion.

At the third operation, four years later, the uterus was bound by adhesions to omentum and abdominal parietes. Its wall was very thin, one part of the cicatrix being actually transparent, so that a rupture appeared imminent. Leopold separated the adhesions, and on opening the uterus again encountered the placenta. The uterine cicatrix was excised, and the wound sutured with silk. Drainage with iodoform gauze.

5 (Olshausen). At the second section, twenty-two months subsequent to the first, the opening of the abdomen close to the old scar revealed numerous firm broad adhesions between uterus and anterior parietal peritoneum. Their separation was effected with finger and scissors. P.P.C.* caused free bleeding, despite the use of the rubber tourniquet. Catgut sutures applied. Uterus remained atonic, and bled profusely, but after removal of the tourniquet it gradually contracted. On the left border of the uterus was a peritoneal tear, 3 cm. long, caused by separation of adhesions, which required suturing.

Four and a half years later the third operation was performed, the abdominal incision (placed close to the former scars) encountering wide utero-parietal attachments, so that extensive dissection with scissors was required to expose the uterus, and even then the peritoneal cavity was only opened at the upper and lower angles of the wound. Complete separation was carried out, an omental adhesion requiring ligature; the uterus was eventrated and incised through the fundus and upper part of the anterior wall. The placenta was attached anteriorly, but lay below the level of the incision. After

* The letters P.P.C. (placenta prævia Cæsarea) indicate that the placenta was attached to the anterior wall of the uterus.

suturing with catgut, atony led to free hæmorrhage. The uterine peritoneum—'shaggy' by reason of the numerous shreds and tags which beset its surface—was repaired with catgut, the procedure drawing the right round ligament close to the wound. The bleeding had now ceased, but it was found that the lower sutures had partly cut through the muscular tissue, so a second layer was applied. Exact suture of the abdominal wall was not possible. The operation lasted one hour. On dismissal, the uterus lay high and was adherent.

6. C. Everke, operating on a patient for the third time, found adhesions so extensive that 'only 2 cm. of peritoneum' were opened. Beyond this statement details are lacking.

7 (J. C. McCoy). After the first operation in 1895 a utero-abdominal fistula formed in the lower angle of the wound. Through this fistula menstrual blood escaped regularly until February, 1898, when conception occurred. At the second section utero-parietal adhesion existed over an area of $2\frac{1}{2}$ inches at the site of the fistula. Adhesions also extended along the whole length of the uterine scar except for a deficiency at the fundal end. 'The adhesions completely surrounded the field of operation save at the fundus of the uterus, where they were deficient. Uniting as they did the anterior surface of the uterus to the parietal peritoneum, they made the operative field practically extraperitoneal.' The defective area above was packed with gauze, and the operation proceeded with. P.P.C. Uterus sutured with silk, and the operator then excised both ovaries and tubes.

8. H. R. Spencer operated for the first time in 1893. At the second operation in 1894 there were adhesions to the omentum and cæcum. At the third in 1900 he found that, 'owing to the adhesion of the uterus to the abdominal wall, resulting from the previous operations, the peritoneum was only slightly opened at the upper and left part of the incision.'

Adhesion occurred after the first operation in Cases 4 and 7, and after the second in Nos. 5, 6, and 8. In Nos. 6, 7, and 8 the operation was actually just short of being extraperitoneal; but in Nos. 4 and 5, although the extent of adhesion was sufficient to justify the view that the section was potentially extraperitoneal, yet actually the uterus in each case was freed from its attachments. These two cases are, therefore, classed with the lesser degree.

In Case 5, and also in Case 2, the uterus appeared to have been handled considerably during the separation of the adhesions, and, in addition, the broad ligaments were compressed manually. It is

significant that in each case atony of the uterus and post-partum hæmorrhage followed delivery.

Cases 5 and 8 illustrate the tendency of adhesions, once they have been formed, to become denser and more extensive with each repetition of the operation.

The formation of a utero-parietal fistula, as in Case 7, was formerly a not uncommon occurrence after Cæsarean section in pre-suture days. Then rupture of the uterus generally took place in such cases in subsequent pregnancies. (*Cf.* Schenk, *Siebold's Jour.*, bd. v., p. 783; bd. vi., p. 377.)

II. Incomplete Utero-parietal Adhesion (see Table B).

9. Zweifel (1888) performed the second section some eighteen months after the first. Intestine and omentum were glued to the parietes, and omentum only to the uterus. With one exception requiring ligature and division, the adhesions were separated by the finger, and the lower part of the uterus was found directly adherent to the abdominal wall. The uterine scar was recognisable only on close inspection. The Fallopian tubes were ligatured with silk. On dismissal, the utero-parietal adhesion had recurred.

10 (Leopold). Utero-parietal adhesion occurred after the first operation in 1886. Five years later, at the second section, the uterus was found firmly adherent to the parietes and mesentery (? omentum). Ligature and division of these attachments were required before it was possible to turn the uterus out of the abdominal cavity, and the ragged surfaces left after separation necessitated drainage with iodoform gauze. Eight silver sutures used at the first operation were removed. Resection of the old uterine scar and extirpation of a right-sided parovarian cyst. On dismissal, the uterus was again adherent.

11. After the first section Krassowski's patient suffered from peritonitis for the first ten days, and as the result of this, utero-parietal adhesion was established, and at the lower part of the wound there opened a fistula six inches long, which persisted 'for some time.' The second operation, eight years later, disclosed a uterus adherent to parietes, bladder, and omentum, the parietal and omental bands being important enough to require division. The uterus showed no trace of the old incision.

12. Therese A. Barth underwent Cæsarean section four times successfully. B. S. Schultze performed the first two, and at the second ($2\frac{1}{2}$ years subsequent to the first) he found the uterus firmly adherent to the parietes, and below to the bladder; the omentum adherent to the parietes, and above the upper limit of the wound

the colon was attached. Considerable difficulty was experienced in freeing these vascular adhesions, twenty-four minutes being occupied by this alone. P.P.C. Severe post-partum hæmorrhage occurred. The old silver sutures were removed. On dismissal, recurrence of utero-parietal adhesion was found, although the corpus uteri was freely movable. Two years later Zweifel performed the third section; several utero-intestinal adhesions were present, but no mention is made of utero-parietal attachment. Three years afterwards Schultze operated for the final time; the abdominal scar was extremely thin, and from it numerous adhesions radiated to the uterus. On the latter the cicatrix was fibrous, 1 cm. wide and 3 mm. thick.

13. G. Braun operated twice—1891 and 1892—and Koffer once, in 1893. At the second section there was considerable omento-parietal adhesion, and part of the omentum was resected. Utero-parietal adhesion not mentioned. Uterus not eventrated.

At the time of the third operation the patient had a pendulous belly and a ventral hernia. The abdomen was opened between the two old scars. Omentum was adherent to both uterine and abdominal parietes, the uterus dextro-rotated 90 degrees, and fixed in this position by tough adhesions. Omentum ligatured off, divided, and the uterus eventrated. The uterine incision opened a small collection of inspissated purulent material, in which was embedded an old suture. The application of the rubber tourniquet was rendered difficult by intimate adhesion between the lower segment of the uterus, omentum, and abdominal parietes, especially on the right side, where a piece of omentum, the size of the palm of the hand, had to be resected. Porro's operation.

14. Rühle, after suturing the uterus, varied the first operation by drawing down the omentum over the anterior surface of the uterus. On the tenth day an abscess formed in the lower angle of the wound. Nearly three and a half years later, at the second section, very vascular adhesions were found uniting a coil of intestine on the one side with the uterus, on the other with anterior parietes. Two long adhesions passed from the fundus to the abdominal scar, and a broad-based one ran from the left fundal area to the thinnest part of the abdominal scar. The omentum was not adherent at all. Porro's operation.

15. The first operation was carried out by an unknown surgeon, and the sole detail concerning it is the vague history of the appearance of 'numerous small abscesses' over the abdominal wall afterwards. Subsequently a hernia developed over the symphysis pubis. Almost six years later Löhlein found at the repeated operation that a

cord-like adhesion, springing from the parietes, had by traction on the uterus rotated it on its long axis, and that the omentum was adherent to the abdominal parietes. Porro's operation.

16. H. Löhlein operated in all three cases, in 1890, 1891, and 1895. At the second section there were adhesions between the great omentum and abdominal wall, and between uterus and anterior parietes. These were readily peeled off. Fever was present from the third to the ninth day, and on dismissal from hospital the uterus was adherent to the abdominal wall. Four years later, when the abdomen was opened for the third time, about 1½ ozs. of clear fluid escaped. In the neighbourhood of the earlier scars were numerous slender adhesions between omentum and the left side of the abdominal parietes, as far down as the pelvis. They were easily separated. The linear uterine cicatrix was clearly visible. P.P.C. Deep silk, superficial catgut sutures.

17. G. H. van der Meij performed the first two operations. At the first the placenta presented through the uterine incision. 'Slight circumscribed peritonitis' followed, so it is not surprising that several strong utero-parietal adhesions were encountered at the second, two and a half years afterwards. There were no traces of the old scar or sutures on the uterus. C. N. van de Poll performed the third section six years later; the omentum was adherent to the upper part of the parietal scar, and below this there were broad utero-parietal adhesions.

Porro's operation. The abdomen had to be reopened the same evening on account of hæmorrhage from separated intestine.

18. There is no information regarding the first operation, except that silk sutures were used. G. M. Boyd, five years later, opened the abdomen at one side of the scar, and after loosening several omento-parietal adhesions found firm utero-parietal adhesion at the lower part of the incision. He did not interfere with this. There was no trace of the former uterine incision or of the sutures.

19. Hegar performed the first operation, and Sonntag the second, after an interval of seven years. Silk sutures were used on both occasions. At the second section the abdominal wall was thin, but adhesions are not mentioned. Three years later Bulius operated for the third time, and he remarks that the abdominal wall was 'right thin'; at its lower part were utero-parietal adhesions, and above, in the umbilical region, the omentum was attached. The latter required double ligaturing and dividing, and some uterine adhesions were freed with scissors; but it was then discovered that the lower part of the uterus 'was but little developed, and proportionately

thin,' so the incision was begun at the fundus and carried downwards.

Each Fallopian tube was matted to its own ovary, so double removal was carried out.

20. The first section was performed in 1891 by a surgeon unknown. Selhorst was responsible for the second in 1899. When the abdomen was opened the finger introduced ascertained utero-parietal adhesion below, but above 'all was well.' Immediate contradiction followed, for after scissors had been employed to enlarge the wound fæces promptly welled up. On closer examination several coils of intestine were discovered adherent to the parietes, and they had to be loosened before the wounded gut became accessible, when a gap involving two-thirds of the wall presented itself. This was repaired. The utero-parietal adhesions were next separated, and the operator was about to open the uterus, when his attention was attracted by a swelling on the uterine parietes to the left of the old cicatrix. It resembled 'half an egg' in appearance, and when opened proved to contain a great deal of pus in which were some well-preserved relics of the first section in the form of silk sutures. The abscess cavity was scraped, and its walls, after partial resection, sewn together. At this point the operator casually remarks that the proceedings had occupied an hour and a half! The uterine scar was recognisable as a blue stripe, it was well consolidated, and quite as thick as the rest of the uterine wall. To its right was placed the incision, which invaded the placenta, free bleeding ensuing. Post-partum hæmorrhage followed, and was treated by 'massage of the uterus.' A short length was resected from each tube, and the old abdominal scar excised.

Dr. Selhorst complains in the preface of his pamphlet that the editors of the *Nederlandsch Tijdschrift voor Geneeskunde* had repeatedly declined to publish his paper!

21. Johannovsky performed both operations, the first in 1892, after which utero-parietal adhesion took place. At the second, in 1900, the abdomen was opened a finger's breadth to the right of the scar, above the umbilicus. Extensive firm adhesions were at once encountered, for the separation of which knife and scissors were required. Figure-of-eight utero-parietal sutures were applied (see under 'Adhesions'), as Johannovsky felt some doubt regarding the condition of the uterine wound.

22. Concerning the first operation in 1895 information is lacking. Brünings performed the second in 1897, and eight days after the operation an abscess formed between the uterus and the abdominal

wall. Even after it had healed there remained a shallow depression, sometimes moist, always covered with a scab. Through this fistula a great deal of blood was discharged when the third labour commenced. On this occasion G. Wiener operated, and found the uterus firmly attached to the abdominal wall, omentum, and intestines. Porro's operation.

III. Cases in which there occurred Adhesion between Uterus and Intestine or Omentum, or between Abdominal Parietes and Intestine or Omentum, or in which there was a combination of both, the Uterus not being attached to the Abdominal Wall (see Table C).

23. The well-known case of Frau Rittgen, who submitted to no fewer than five Cæsarean sections. Of the first, in 1875, there are no details. F. G. H. Birnbaum performed the second in 1878, when the omentum was adherent to the abdominal wall. A subperitoneal blood effusion, considered to be indicative of tearing, was present in the lower part of the uterine scar. Post-partum hæmorrhage was checked by ice placed in the uterus. The latter was closed with four catgut sutures. Drainage of the abdomen. Of the third section in 1879 no report is forthcoming, but Birnbaum performed the fourth in 1881, and had to divide the omentum from the entire length of the abdominal scar. The subperitoneal blood effusion was again in evidence, bleeding was stilled with ice as before, and catgut sutures employed to close the uterus. The final operation was done by Birnbaum also, the omentum having this time to be ligatured and divided from the uterus. On the latter the blood effusion was again visible. The plucky woman succumbed on this occasion, and the post-mortem examination disclosed general peritonitis, evidently due to leakage from the gaping uterine wound.

24. Birnbaum operated in 1882 and 1884. At the second section a coil of intestine was adherent to the abdominal wall. P.P.C. led to 'enormous hæmorrhage.' Death from septic peritonitis.

25. The patient was a dwarf, who submitted to the second section in 1890, two years after the first. Some intestines were adherent to the uterus, the wall of which was thinned. The uterine wound was not sutured! Death occurred from general peritonitis.

26. At the first operation in 1891, Staude found the placenta anteriorly attached, a condition again present at the second in 1893. The omentum adhered to the abdominal wall, the uterus being free

save for one long slender adhesion uniting it with the parietes. The scar was visible as a smooth, narrow streak.

27. The first section took place in 1891, and G. Braun performed the second two years later. The intact abdominal wall was incised near the scar under which the peritoneum was thickened. Omentum adherent to uterus over an area the size of a crown-piece was tied and divided. Examination of the uterine scar showed it to be well formed, thick, and composed of tough cicatricial tissue. P.P.C.

28. The second section was performed a year after the first by Schneider. An unusual condition presented itself in the shape of adhesion of omentum and intestine to the *posterior* wall of the uterus. The eventration of the uterus was thus rendered difficult and the application of the rubber tourniquet impossible. Manual compression was therefore resorted to. P.P.C.

At the first operation, which was carried out with the strictest aseptic precautions, the uterus had been eventrated and the rubber tourniquet employed, but the uterus appears to have been so tenderly treated that the infliction of any injury does not seem probable. There was no rise of temperature during the puerperium, but for the first eight days the patient complained of abdominal pain to which little importance was attributed. Adhesion was probably taking place then.

29. Smyly operated both times. The second operation was begun when daylight was fading, and had to be completed by lamplight. Intestines were firmly adherent to the uterine scar, and were detached with considerable difficulty. Further trouble arose with the uterine cicatrix, which was so thin that it gave way to the pressure of the thumb. The cicatricial margins offered so little raw surface that union appeared doubtful, and they were therefore split with scissors and then united with deep and superficial sutures.

The patient died on the fourth day from peritonitis, due to leakage from a small opening in the intestine, which had been overlooked.

30. Leopold operated in 1890 and 1897. During the interval diastasis of the recti muscles had taken place. At the second operation firm adhesion of the sigmoid flexure with the uterus was divided with Pacquelin's cautery. The anterior wall of the uterus was thinned and had the placenta attached to it.

31. All three operations were performed by E. Pollak, in 1896, 1897, and 1899. At the second the omentum was adherent to the uterus, especially on its left, and at the third similar adhesion existed in several places.

32. N. Raw was the operator at both sections. The second took place twenty-one months after the first, and 'the uterus was not at all adherent to the abdominal wall, although some bands of omentum were adherent to the scar.' P.P.C.

IV. Cases of Slight (Filamentous) Utero-Parietal Adhesion (see Table D).

33. Olshausen found 'no important adhesions' at the second operation, two and a half years after the first.

34. The first two operations were performed by Tarnier, who makes no mention of the presence of any adhesions at the second. They were probably slight or absent, for when Paul Bar opened the abdomen for the third time, although 'sheets of fibrous tissue completely masked the uterus,' they were easily broken down, and formed a complication of no importance. The uterine wall was so thin that the ovum threatened to burst its way through.

35. Paul Bar operated on three occasions—1894, 1896, 1897. The uterus was sutured with silk each time. Weak adhesions, easily separated by the finger, were found at the second section, and again at the third. This time the uterine wall was extremely thinned, and a hernia ovi appeared imminent.

36. Schauta performed the second section two and a half years after the first. The uterine cicatrix was covered by a 'pseudo-membrane,' which spread out in a fan shape to the abdominal parietes.

The filamentous adhesions in these cases appear from the descriptions to have been thin and delicate—mere cobwebs, which offered no difficulty of any kind, so that each repetition of the operation was a simple conservative section.

In Cases 37 to 43 (inclusive) there were no adhesions.

Case of Repeated Section after Posterior (Median) Incision of Uterus (see Table F).

44. This is the only instance of a second section after the deliberate performance of posterior median incision. Sippel, who was responsible for the latter, maintains that it is impossible to suture accurately a uterine wound which involves the placental site. Therefore, after diagnosing the position of the latter, he places the incision so as to avoid it, and accordingly, at the first section in 1898, the posterior wall of the eventrated uterus was incised along the middle line. The wound was closed with continuous catgut sutures.

Fifteen months later, E. Petersen opened the abdomen to the left of the scar, and found a cord-like adhesion running to the anterior parietes. This was divided and the uterus eventrated, when similar adhesions were discovered uniting small intestine to the cicatrix on the posterior wall of the uterus. The placenta was attached anteriorly, so the 'Fundalschnitt' was carried out at the cost of considerable hæmorrhage. When the patient was dismissed from hospital, the high-lying, anteflexed uterus was adherent to the lower third of the abdominal cicatrix.

CASES OF REPEATED 'FUNDALSCHNITT' (SEE TABLE G).

45. Both operations were performed by Fritsch. After the first, in 1897, the uterus lay freely movable in the pelvis. At the second, in 1899, the abdomen was opened to the left of the scar. Omentum adhered to the right extremity of the uterine cicatrix (the only portion of the latter that was recognisable) and to the fundal area behind this. It was tied, divided, and the uterus opened. Examination failed to demonstrate the presence of cicatricial tissue in, or thinning of, the fundus. The after-history of the case is interesting. Progress was normal until the eleventh day, when the sutures were removed from the primarily united wound. From the thirteenth day onwards slight evening rises of temperature were noticed, and the lochia became profuse and offensive, and on the fifteenth day suppuration of a stitch-track at the lower part of the wound was present. Whilst the uterus was being washed out with lysol some of the solution was observed to be escaping through the suppurating stitch-track, so the douching was at once discontinued. Later, several silk sutures came away, both *per vaginam* and through the fistula. Gradually all disturbance disappeared, the fistula diminished to 2 cm. in length, and the patient was transferred to the Poliklinik as an out-patient. The fistula healed up, only to break out again to give exit to more sutures, so the patient re-entered hospital. On April 17 a probe passed 5 cm. along the fistula, to the neighbourhood of which the uterus seemed firmly fixed. After dilatation by means of laminaria tents, a panelectroscopic examination of the fistula revealed the presence of a buried suture, but attempts to remove it failed. Under anæsthesia, the fistula was scraped and sutured, but, as it broke down again, Fritsch resolved to excise it, and at the same time free the adherent uterus. This was done on May 14. Tough, thick, cicatricial masses united the uterus to the abdominal parietes around the whole circumference of the fistula and its neighbourhood. Two coils of

small intestine were adherent to the fundal area behind the scar and to the posterior uterine wall. Scissors had to be employed to free these adhesions, and in the process injuries were inflicted on the intestinal serosa, which necessitated careful suturing, whilst the raw surfaces left on the uterus required touching with Pacquelin's cautery in order to check the oozing of blood from them.

The patient died on the fourth day from general peritonitis.

46. At the first operation, in 1898, R. Hlawacek discovered, after replacing the sutured uterus in the abdomen, that two coils of intestine were adherent to the abdominal parietes above the upper limit of the incision. R. Ludwig performed the second section in 1899, the abdomen being opened along the line of the perfectly intact scar. Omento-parietal adhesions were found at the upper end of the incision, and a small part of the omentum was attached to the sites of the silk sutures beside the scarcely recognisable uterine scar. Separation was effected without difficulty, 'Fundalschnitt' repeated, the placenta presenting through the incision. The uterine cicatrix was $1\frac{1}{2}$ cm. in thickness, and had not yielded in the slightest.

It is interesting to note that in both cases (45 and 46) of repeated 'Fundalschnitt' the uterus acquired adhesion to omentum alone after the first operation. But in Case 45, and also in Case 44 (in which the 'Fundalschnitt' was performed at the second section), the repeated operations were followed by extensive utero-parietal adhesion.

Perusal of the foregoing cases suggests many points that call for more extended consideration, but the scope of this paper is limited mainly to those bearing on the important subject of adhesion.

It is evident that in the majority of cases there are formed adhesions whose development it is beyond the power of the surgeon to prevent, and whose extent it is impossible for him to control. It is also evident that these adhesions may seriously complicate the repeated operation, or reduce it to one of extreme simplicity. The attention is arrested by the ease and safety with which the repeated operation may be carried out when performed extraperitoneally, as compared with cases in which less extensive adhesion necessitates laparotomy. The former condition, however, is by no means a modern one.

The old operation, when the patient recovered, left her with utero-parietal adhesion, either of an extensive nature and sometimes associated with fistula, or limited to the line of the wound. The operators themselves practically, though unintentionally, connived at the occurrence of this adhesion by placing in the lower angle of the wound *sindons* or *bourdonnets*, along which the secretions of the

uterus and the wound found their way, or, in default of such a drain, became encapsuled as abscesses between uterus and abdominal wall. In fact, it was as though recovery depended on the occurrence of adhesion. One observer, at least, accepted this hint from Nature—G. A. Michaelis[8] of Kiel. This surgeon performed the third and fourth Cæsarean sections on Frau Adametz, and his description of the fourth operation, in 1836, is worth quoting:

'I had already expressed in my treatise that the most favourable condition possible for the repeated operation was when the abdominal wall was found adherent to the uterus to such an extent that the incision fell within the limits of the adhesions; I thought that this might be the case with Adametz. The advantages which such an incision holds out, with which the peritoneal cavity is not opened at all, are too evident to require further exposition. Prolapse of intestines, entrance of blood and pus into the peritoneal cavity, would then be impossible, and the only disadvantage to be feared would be that the contracting uterus would hold open the abdominal wound and hinder its rapid closure. I was therefore firmly resolved to investigate carefully beforehand in what directions such adhesions existed and where to make the incision, in the which resolution Professor Busch of Berlin strengthened me with his most kindly advice. However, the examination afforded no satisfactory information, as accurate investigation was not admissible on account of the tenderness of the scar; and even after the onset of the pains had led to the contraction of the uterus, the skin was wrinkled in only three places, which I had already earlier recognised and noted as adherent; between them the skin was movable over the hard, contracted uterus. I therefore designed the site of the incision in such a manner that it coursed near all three adherent patches, since these isolated points only promised partially the advantage of adhesion, which I had expected to find developed to its full extent. The incision was placed to the left of the middle line, and ran obliquely from above and externally downwards and internally, crossing the second and third scars at an acute angle. The incision was 5 inches in length. Two strokes of the knife divided completely the one and a half lines thick abdominal wall, and the third stroke entered the substance of the uterus, in which two large veins bled profusely. The peritoneal cavity appeared unopened, since the uterus was completely adherent to the abdominal wall.'

After delivery of child and secundines, Michaelis goes on: 'Thereupon I examined the adhesions to the abdominal wall, and found them so intimate below that a square inch of the external skin

formed, as it were, the outer surface of the uterus. In other places, however, it (the adhesion) was only effected by a loose extensible cellular tissue which completely surrounded the wound without interruption. I could not recognise former scars of the uterus on its inner surface by touch. The anterior wall appeared of varying thickness in different places, internally uneven, yet completely cicatrized. That the placenta had covered this surface was an unfavourable circumstance for this investigation, by reason of the loose, uneven surface left after its detachment.'

The successful issue of the operation justified the views expressed by this acute observer—views which were speedily forgotten even by contemporary operators. Their successors of later generations had to deal with uteri which had been carefully sutured at previous sections, and with the introduction of the accurate uterine suture there came a change in the significance of utero-parietal adhesion. Once a desideratum, it came to be regarded as a complication that might, and did, lead to disaster.

I have collected from European and American literature 96 cases of the repeated operation. Of this number, 28 belong to the period when the 'old method' was in vogue, so that only 68 are instances of the modern operation. To the literature of 5 of these I have not been able to obtain access, 2 others are examples of repeated 'Fundalschnitt,' and in another the uterus was opened by a posterior incision at the first operation.

| | | |
|---|---|---|
| Cases in which the uterus was not sutured ... ... | | 28 |
| Modern cases: | | |
| 1. Cases more or less fully reported ... ... | 60 | |
| 2. Repeated 'Fundalschnitt' ... ... ... | 2 | |
| 3. Case of posterior incision of uterus ... | 1 | |
| 4. Cases literature of which is inaccessible ... | 5 | |
| | — | 68 |
| Total of all cases ... ... ... ... | | 96 |

Taking into consideration the 60 modern cases, Cæsarean section was performed twice in each of 43 cases, three times in each of 15 cases, four times in 1 case, five times in 1 case.

Examples of the 'old method' give the following numbers: Twice in each of 15 cases, three times in 2 cases, four times in 2 cases.

Altogether, there are 58 instances of two repetitions each, 17 of three repetitions each, 3 of four each, and 1 of five.

In the reports of 17 out of the 60 modern cases no mention was made of the presence or absence of adhesions of any kind. Thus, but 43 are left for analysis. As I indicated in the earlier part of the paper, these cases may be arranged into five groups, according to the variety and extent of the adhesions present. The number of cases and percentages in each class are tabulated below:

| Table. | Varieties. | Number of Cases. | Percentages. | Mortality. | Percentage. |
|---|---|---|---|---|---|
| A. | 1. Complete utero-parietal adhesion | 3 | 6·9 | 0 | |
| | 2. " " " " | 5 | 11·62 | 0 | |
| B. | Incomplete " " " | 14 | 32·55 | 0 | |
| C. | Utero-visceral adhesion .. ... | 10 | 23·25 | 4 | 9·30 |
| D. | Slight utero-parietal adhesion ... | 4 | 9·30 | 0 | |
| E. | Adhesions absent ... ... ... | 7 | 16·28 | 0 | |
| | | 43 | — | 4 | |
| | Cases in which adhesions are not mentioned ... ... ... ... | 17 | — | 0 | |
| | | 60 | | 4 | |

The extent of adhesion in the cases in Group D was so slight that for clinical purposes these 4 cases may be classed with those in which adhesion was entirely absent, the two together representing 25·38 per cent. of all cases. In the remainder, almost 75 per cent., marked adhesions existed. In the former, no deaths occurred; in the latter, 4 patients died, a mortality of 9·30 per cent., or, including only cases of adhesion (36), of 11·11 per cent.

Further investigation shows that the presence of any marked form of adhesion, except the complete utero-parietal, tends to render repeated sections more formidable for the following reasons:

1. Their separation increases the duration of the operation (*cf.* Case 12, in which the duration of the second operation was lengthened by twenty-four minutes, spent solely in freeing adhesions). Further time may be lost in repairing areas denuded of peritoneum by separation of adhesions. Surgical shock is thus intensified.

2. Their separation may cause serious hæmorrhage.

3. The handling of the uterus during the separation of adhesions appears in some cases to favour the occurrence of atonia uteri and post-partum hæmorrhage.

4. Injury to intestine:

(*a*) Actual perforation, with fatal result directly due to this traumatism, as in Case 29.

(*b*) Bleeding from separated intestine, which may necessitate the reopening of the abdomen, as in Case 17.

(*c*) Direct wounding of adherent gut, as in Case 20.

5. Rotation of the uterus, illustrated by Cases 13 and 15. In the former, rotation was permanently maintained by adhesions, and its possibility should be borne in mind in cases of utero-parietal adhesion, otherwise the incision may be placed close to, or even involve, the broad ligament.

In the face of difficulties and dangers such as these, it is not surprising that the majority of operators have hitherto regarded adhesions with strong disfavour, and have endeavoured to solve the riddle of their prevention. Torggler[6] recommended the use of silver wire sutures as being least likely to cause adhesions, but Korn declares that silver wire promotes their development, and urges the advantages of catgut and silk. Subsequent experience has shown that the material of which the sutures are composed is a matter of indifference. Döderlein tried the application of iodoform collodion over the uterine wound, but with negative results. Rühle[9] spread the omentum over the whole anterior surface of the uterus without success. Buckley[3] suggested pushing the omentum behind the uterus, in order to prevent utero-omental adhesion. N. Raw[3] stated that he had tried this, but the omentum would not remain where it was placed.

Paul Bar[10] considers that the formation of adhesions signalizes defective asepsis, and holds that as technique becomes more perfect the risks of adhesion will diminish. With reference to this view of the matter, it is not possible to affirm that intraperitoneal adhesion is invariably due to sepsis. Mere mechanical or chemical irritation or injury suffices to provoke its formation. Professor Sherrington informs me that during the course of some experiments, carried out in conjunction with Mr. Ballance, thin cover-glasses introduced into the peritoneal cavity always became 'shrouded in filmy adhesions,' which neither of the experimenters regarded as the result of sepsis. Some years ago, I performed a series of experiments on the effects of introducing various sterile substances into peritoneal cavities, and all of them, without exception, were at once enveloped in lymph. Sterilized glass beads, glass marbles, pieces of metal, cork, lamp-black, all shared the fate of prompt capture. The presence of sterile silk or catgut sutures within the peritoneal cavity must provoke the same effusion, and to this effused lymph probably any peritoneal surface in contact with it becomes adherent. In the same manner, destruction of peritoneal endothelium by handling, or drying, or rubbing with iodoform or sublimate solution, results in a wound to which any adjacent peritoneal surface may adhere. Many a woman whose convalescence after her first section has progressed in a

typically aseptic manner has presented marked intraperitoneal adhesions at the second operation. These cannot be attributed to sepsis, but rather to the presence of sutures and to traumatism inflicted upon the peritoneum during the operation.

There have been operators, however, who, far from discouraging utero-parietal adhesion, have endeavoured to bring it about, although not always with the same end in view.

Pillore[11] (1854), in order to prevent the escape of lochial discharge into the peritoneal cavity, sewed the edges of the uterine wound to those of the lower third of the abdominal incision, the upper two-thirds of the latter being closed entirely. He states that he used this method 'with result,' and that the lochia drained away through the utero-parietal fistula. He convinced himself on the deaths of women who had long before undergone Cæsarean section that the utero-parietal union was complete, but he makes in addition the curious statement, 'A repeated operation, in spite of the adhesions, could not be made.'

Bayer[12] suggested a procedure very similar to Pillore's, but did not put it into execution.

Ed. Martin[13] (1864), at the Berlin Obstetrical Society, suggested the revival of Pillore's procedure, which had apparently fallen into disuse. He emphasized the necessity for fixing the uterus as low down as possible, in order to prevent the risk of subsequent tearing; but at the same time he states that in cases of formation of adhesions spontaneously no evidence of such tearing has even been found. The uterus comes to lie somewhat higher than usual, and 'the increase caused by subsequent pregnancy involves chiefly the fundus and posterior wall.' The proposal was received with the same disfavour as that accorded to Pillore's paper, and Martin did not himself carry the suggestion into execution.

Gius Testa[14] (1867) put forth the curious proposal that the uterus should be skewered to the abdominal wound by means of a peg or pin passed through both structures (as one would pin two pieces of paper together), thus fixing the two wounds in apposition. The proposition remained in the theoretical stage.

Dusart[15] published from the manuscript of Lestocquoy, eight years after the latter had performed the operation, an account of the method employed. The abdomen was opened and the uterus carefully incised without injuring the ovum. The uterine peritoneum was then sewn to that of the abdominal wall by means of five sutures on each side. This allowed the liquor amnii to flow away after rupture of the membranes, without any finding its way into the

peritoneal cavity, and the fœtus was then extracted. The opening was not closed, and the lochia drained away through it. On the fortieth day the wound was completely healed.

Tarnier employed this method, but his patient died.

J. Braxton Hicks[16] had trouble with bleeding in a case of Cæsarean section, so 'passed the needle armed with silver wire completely through the wall (of the uterus) about a quarter of an inch from the margin of the incision, and brought it out again about half an inch lower down, thus enclosing the opening (of the bleeding vessel). After finding that the hæmorrhage had quite ceased from other parts, the wires were carried from within through the abdominal parietes, and then fastened with those of the opposite side. To make a more complete apposition another suture, an inch lower down, was passed through uterus and abdominal walls, and brought together as usual. Elsewhere, the abdominal parietes only were transfixed.'

This procedure was the application of a proposal already previously made by the operator, and it was successful in preventing any lochial discharge from finding its way into the peritoneal cavity. The patient, however, had been in labour for a very long time before Dr. Hicks saw her, and she succumbed in three and a quarter days. The post-mortem examination 'showed healthy plastic peritonitis in the neighbourhood of the wound, which on its skin side was uniting.' 'No extravasation into the peritoneal cavity had occurred, notwithstanding that the sickness had been so severe as to drive a small portion of the omentum through the upper angle of the parietal wound.'

Robert Barnes[17] suggested the employment of figure-of-eight sutures for simultaneously closing the uterine and parietal wounds, and bringing both into close apposition with each other. He devised an ingenious system of sutures, but his method does not seem to have been put into execution.

Frank[18] of Cologne eventrated the uterus, and dissected it out from the vesico-uterine fossa. The upper parts of the round ligaments were then sewn to the anterior abdominal wall, and their lower portions to the parietal peritoneum. A kind of 'tent' was thus formed—an ante-uterine cavity—into which both the abdominal and uterine wounds opened. The uterine wound was partially closed, a drain passing into it through the abdominal opening and thence out by the vagina. A second drain passed behind the bladder into the anterior vaginal fornix, and a third led from the ante-uterine cavity externally. The patient died in ten hours. Commenting on this

case, Kehrer remarks that in his opinion the method seemed to be the one that offered the greatest chances of recovery. Kehrer's[19] own method of opening the uterus consisted in incising it transversely around the circumference of the internal os. Theoretically, the only organ that could become adherent to such a wound would be the bladder, and for that reason the incision seems especially adapted for the prevention of utero-parietal or utero-intestinal adhesions. It was not generally adopted, however, and Kehrer himself operated but twice in this manner, with a fatal result in one case. In order to obtain utero-parietal adhesion he energetically washed the anterior wall of the uterus with 1 in 1,000 sublimate solution.

A. V. Johannovsky[20] employed in a case of repeated Cæsarean section a form of utero-parietal suture very similar to the figure-of-eight suggested by Robert Barnes. Five or six silkworm-gut sutures were introduced through the edges of the uterine wound, but left untied. The left-sided ends were passed through the right edge of the abdominal wound, and the right-sided ones through the left edge, so that a series of figure-of-eight sutures resulted when the ends were tightened, and the uterus was thus fixed firmly to the abdominal wall. Johannovsky made use of this method of suture because he was not satisfied with the condition of the uterine wound in his patient, and also because raw surfaces were left on the anterior wall of the uterus where adhesions had been separated. As he points out, even if the uterus had not been attached to the parietes, adhesions would have formed in the situations of these raw places. Nevertheless, he does not approve of such a method of suture, and would limit its application to cases in which the uterine wound is not thoroughly clean and normal.

W. J. Sinclair[2] endeavours to bring about utero-parietal adhesion by the application of pressure. He 'found that adhesion to the abdominal wall was the usual condition after Cæsarean section, and preferred to take measures to favour this adhesion by padding the abdominal wall, so leaving the uterus in a state of ventro-fixation.' Dr. Sinclair informs me that he rubs the uterine peritoneum with iodoform before closing the abdomen, in order to favour adhesion.

In the case I have related I carried out direct utero-parietal suture of the *already sutured uterus*, my chief object being to ensure such adhesion of the uterus to the abdominal wall as would permit, in the event of another conception, of the termination of the pregnancy by an extraperitoneal Cæsarean section. By the procedure I hoped also to prevent the formation of adhesions between uterus or

abdominal wall and other abdominal viscera. The fixation of the two wounds in close apposition, and the approximation of the whole anterior uterine surface to the parietes resulting from this suture, should preclude either intestine or omentum from contracting attachments to surfaces which clinical experience teaches are those most prone to acquire them. It might be urged that the upper portion of the parietal wound, not being in contact with the uterus, would possibly offer a site for omental or intestinal adhesion. This portion of the abdominal wall was sutured in three layers, and it is not likely that careful closure of the peritoneum would leave any area which could contract adhesion with an abdominal viscus. Even though this did occur, it would be above the zone of utero-parietal attachment, and should, theoretically, not interfere with a subsequent section.

I repeated this procedure in a case operated upon in August of this year, and the uterus still remains in its high position, firmly adherent to the abdominal wall. In another case, operated on a week ago, I adopted the method, employed by Professor Sinclair, of padding the abdominal wall. I took the precaution of steadying the two wounds in apposition, however, by placing three silkworm-gut sutures, one in the centre and one a centimetre beyond each extremity of the uterine wound. These steadying sutures were passed before the closure of the parietal wound was commenced, and were not tightened until the latter had been sutured in three layers. In this manner I obtained exact apposition, and also the undoubted advantage of triple suture of the abdominal wall. It is of importance that this form of suturing the parietes should be carried out if possible, because frequent repetition of Cæsarean section has hitherto led to ventral hernia in many cases. Dr. J. E. Burton, my senior colleague at the Hospital for Women, still further modified the method of utero-parietal suture in a case on which he operated recently. He sewed peritoneum only to the uterine wound, and then closed separately the fascial and skin layers of the parietes.

### The Changes that occur in Utero-Parietal Adhesions, and their Effect on the Position of the Uterus.

This is a point of considerable importance, since the objection might be urged against induced utero-parietal adhesion that it is transitory in its nature, and that we have no means of ensuring a permanent attachment. It is known that many intraperitoneal adhesions tend to disappear, and that others persist; but what determines disappearance or persistence is not known. The records

of the after-history of cases of Cæsarean section are too incomplete to assist in solving the question, confined as they are to the bare statement that on the dismissal of the patient from hospital 'the uterus was anteflexed, adherent to the abdominal wall, and' more or less 'movable.' The position is in some cases stated to be 'high.'

In the writer's case the corpus uteri remained in the abdomen, attached closely to the parietes, for about two months, and it then gradually descended, until the uterus had arrived at its usual level. Gravity, alternate distension and emptying of the bladder, and 'intra-abdominal pressure' led to the stretching and elongation of the adhesion, until it probably resembled an exaggerated urachal fold, or an inverted model, on a smaller scale, of the falciform ligament of the liver.

Some eighteen months ago I performed Cæsarean section in a woman whose flattened pelvis (Cv. = $2\frac{1}{2}$ inches) was roofed over by a large intraligamentous fibromyoma. The patient was an elderly primigravida, and in such ill-health that Cæsarean hysterectomy was out of the question. Six months later the myomatous uterus was successfully removed by supravaginal amputation. Its size was such as to compel a permanent position in the abdomen. The incision was purposely placed so as to allow of a view of any possibly existing adhesions being obtained, and when the abdominal wall was drawn away from the uterus three lines of adhesions became visible. They were arranged like an arrow-head diagrammatically represented, and were about $\frac{3}{4}$ inch in antero-posterior measurement, and varied from 1 inch to $1\frac{1}{2}$ inches in length. They were thin, being thickest at their upper edges, which presented concavities superiorly. Neither intestine nor omentum was adherent to uterus or parietes.

In this case adhesion resulted from the continued approximation of the two wounds by the pressure of the usual dressings and abdominal bandage — the method employed by Professor Sinclair to obtain ventro-fixation. Subsequently the movements of the abdominal parietes led to lengthening of the antero-posterior diameter, just as involution of the uterus caused vertical diminution of the adhesions. This case shows clearly enough that mere continued approximation of the two wounds is sufficient to lead to utero-parietal adhesion; and also that, as the uterine and parietal surfaces adjacent to the wounds are approximated as well, both intestine and omentum are prevented from acquiring attachments which might complicate future operations.

It is not possible to pass beyond theory in considering the changes that occur in utero-parietal adhesion with the advent of another pregnancy. Probably the enlarging uterus opens up the lateral boundaries of the band, and, growing in between them, again comes into contact with the connective tissue of the parietes. Whether this area of contact is as extensive as it was immediately after the preceding section is open to question; but in some cases, at any rate, its range is sufficient to allow of the incision falling within its limits. A case reported by Rapin[21] favours the probability of this occurrence. The patient, who had a deformed pelvis, underwent ventro-fixation of the unimpregnated uterus for retroflexion. A year later she became pregnant, and the pelvic deformity necessitated Cæsarean section. It was recognised that the uterus was adherent, and the incision, made through the scar of the previous operation, opened the uterus without encountering peritoneum. It was enlarged, and only in its lower angle was the peritoneal cavity entered. The woman made a good recovery.

The duration of utero-parietal adhesion can be estimated to some extent by an investigation of the table on p. 582, in which are represented the intervals between consecutive sections in all cases of the varying forms of adhesions.

From a study of this table it will be recognised that the limits of the existence of adhesions have in no case been reached. The majority of repeated sections take place before the eighth year, and yet of the four cases tabulated in the eighth column—

No. 11 showed strong adhesions (requiring division) between uterus and parietes and omentum.

No. 17, broad utero-parietal adhesions.

No. 20, adhesion of the lower part of the uterus to the parietes.

No. 21, 'extensive, firm adhesion' was encountered.

The conclusion indicated by these facts is further supported by the condition found post-mortem in two of the 'old' cases. Fulda[22] in 1823 performed Cæsarean section on a woman for contracted pelvis. She died in 1847 of pneumonia, and Fulda had the opportunity of making the post-mortem examination. This disclosed the persistence of utero-parietal adhesion during the whole period which had elapsed since the operation. The other case was that of a woman aged twenty-eight, upon whom William Gibson[23] operated twice. She died forty-four years later, and at the autopsy utero-parietal adhesion was still well marked.

INTERVALS BETWEEN CONSECUTIVE CÆSAREAN SECTIONS.

(Numbers denote cases in tables. Roman numerals indicate years.)

| Variety of Adhesion. | I. | II. | III. | IV. | V. | VI. | VII. | VIII. |
|---|---|---|---|---|---|---|---|---|
| | 2<br>4<br>8<br>9<br>13<br>13<br>16<br>22 | 5<br>5<br>12<br>12<br>12<br>17 | 2<br>7<br>14<br>19 | 4<br>16<br>22<br>— | 1<br>10<br>18<br>— | 8<br>8<br>19<br>15 | 19<br>—<br>—<br>— | 11<br>17<br>20<br>21 |
| A and B. Utero-parietal (31 sections). | 8<br>25·8% | 6<br>19·3% | 4<br>12·92% | 3<br>9·6% | 3<br>9·6% | 2<br>6·4% | 1<br>3·2% | 4<br>12·9% |
| | 23<br>28<br>30<br>31<br>— | 24<br>25<br>26<br>27<br>31 | 23<br>23 | — | — | — | 30 | |
| C. Utero-visceral (12 sections). | 4<br>33·3% | 5<br>41·65% | 2<br>16·66% | —<br>— | —<br>— | —<br>— | 1<br>8·33% | |
| | 35<br>—<br>— | 33<br>35<br>36 | | | | | | |
| D. Slight utero-parietal (4 sections). | 1<br>25% | 3<br>75% | | | | | | |
| | 43<br>—<br>— | 38<br>38<br>39 | 41<br>— | 37<br>40 | | | | |
| E. No adhesions (7 sections). | 1<br>14·2% | 3<br>42·8% | 1<br>14·2% | 2<br>28·4% | | | | |

The repetition of a number indicates that in that particular case there were three or even four sections.

There is, therefore, no ground for regarding utero-parietal adhesion as merely a transient condition, but, on the contrary, the evidence is in favour of its stability.

### The Effect of Third and Fourth Repetitions of Cæsarean Section in Relation to Adhesions.

The number of cases is too small, and the data obtainable from the average reports of them are too imperfect, to justify more than the statement that, when adhesions are present at the second section, it is tolerably certain that they will be found

at each succeeding operation in—if they vary at all—a slightly more marked degree. This is shown in the table below.

TABLE SHOWING DEGREE OF ADHESION AT SUCCESSIVE OPERATIONS.

| | Case. | Degree of Adhesion in | | | |
|---|---|---|---|---|---|
| | | Second Operation. | Third Operation. | Fourth Operation. | Fifth Operation. |
| Table A. | 2 | Incomplete utero-parietal. | Complete. | | |
| | 4 | Almost complete utero-parietal. | Utero-parietal, more marked. | | |
| | 5 | Almost complete utero-parietal. | Complete utero-parietal. | | |
| | 6 | ? | Almost complete utero-parietal. | | |
| | 8 | Utero-visceral. | Complete utero-parietal. | | |
| Table B. | 12 | Incomplete utero-parietal. | Utero-visceral. | Incomplete utero-parietal. | |
| | 13 | Utero-visceral. | Incomplete utero-parietal. | | |
| | 16 | Incomplete utero-parietal. | Incomplete utero-parietal. | | |
| | 17 | Incomplete utero-parietal. | Incomplete utero-parietal, more marked. | | |
| | 19 | ? | Incomplete utero-parietal. | | |
| | 22 | ? | Incomplete utero-parietal. | | |
| Table C. | 23 | Parieto-omental. | ? | Parieto-omental. | Utero-omental. |
| | 31 | Utero-omental. | More marked utero-omental. | | |
| Table D. | 34 | ? | Slight utero-parietal. | | |
| | 35 | 'Weak adhesion.' | 'Very slight adhesion.' | | |
| Table E. | 38 | ? | No adhesions. | | |
| | 40 | No adhesions. | ? | | |

Complete utero-parietal adhesion has the unimportant disadvantage that it throws some difficulty in the way of diagnosis of the placental site before the opening of the uterus. To know precisely where the placenta is attached may add to the comfort of mind of the operator, but the knowledge is not essential. In the presence of utero-parietal adhesion an anterior placental attachment may be signalized, as W. J. Sinclair has pointed out, by the unusual development of veins in the uterine wall.

The occurrence of atony of the uterus and hæmorrhage might at first sight appear a formidable complication in cases of utero-parietal adhesion, but even if they occurred, the bleeding would be at least as much under control as it is in a labour terminated *per vaginam*. The same remedies could be employed: compression of the uterus, injection of sterile hot water through the wound, or even of adrenalin solution, and, if necessary, the uterine cavity could be packed very readily through the wound.

### The Effect of Repeated Cæsarean Section on Fertility.

The earlier operators, almost without exception, considered that diminution in fertility resulted. This opinion, however, seems to have been based merely on impressions, for, with the exception of Torggler, no writer has dealt with actual facts.

The only series of cases available for estimating the percentage of recurrences of pregnancy after Cæsarean section is that published in 1898 by Leopold and Haake[24], taken in conjunction with the earlier series of Leopold's cases tabulated by Cörner[25]. These tables include 100 operations, of which 72 were examples of the conservative section. Of these, 29 were instances of repeated section, performed on thirteen women, of whom three underwent the first operation at other clinics. This gives a percentage recurrence of pregnancy of about 22, an estimate which can only be considered a relative one, by reason of the small number of cases on which it is based.

Why more women do not present themselves for the repeated operation is explained on four grounds:

1. The mortality of the first operation.
2. Sterilization by the operator.
3. In a certain number of cases subsequent pregnancies are interrupted, lawfully or otherwise, by the induction of abortion or premature labour.
4. The first operation conveys to the patient a sharp intimation of the danger of further child-bearing, and this may lead to an improvement in the morality of the single woman, and possibly to the adoption of preventive measures by the wife.

The table on p. 582 contains 51 instances of repeated section: of these 28 were single, 7 double, and 4 triple repetitions. The intervals that separated each operation from the preceding one are shown below:

| Years. | Cases. | Per Cent. | Years. | Cases. | Per Cent. |
|---|---|---|---|---|---|
| 1 | 14 | 25·9 | 5 | 3 | 5·5 |
| 2 | 17 | 31·48 | 6 | 2 | 3·7 |
| 3 | 5 | 9·25 | 7 | 1 | 1·8 |
| 4 | 5 | 9·25 | 8 | 4 | 7·4 |

### The Relation of Rupture of the Uterus to Conservative Cæsarean Section.

During the period from which the 18 cases of the 'old method' have been collected, there occurred 24 instances of rupture of the

uterus during pregnancies subsequent to the conservative operation. Krukenberg[26] relates these in detail, and classifies them thus:

1. Fifteen cases of rupture through the scar, with escape of the fœtus in the peritoneal cavity. Six died.

2. Five cases in which the scar only partially gave way, so that the fœtus remained *in utero*. Four died.

3. Three cases in which the tear was not in the scar, but twice in the posterior wall and once in the anterior wall. One died.

4. One case of rupture through parts adjacent to the old scar. Death.

I have met with only five cases of rupture of the uterus during the modern period, and in but one instance is a full report given. This case was published by G. Woyer[27]. Cæsarean section was performed by Chrobak in 1893, when the uterus was closed with deep and superficial silk sutures. During the next pregnancy the woman noticed that her abdomen was bigger than usual. Rupture occurred at the beginning of labour, and on the patient's arrival at hospital, the abdomen was at once opened. One intact ovum lay in the right iliac fossa, and the second, also intact, lay under the left costal arch. Death took place on the same evening. Examination of the uterus showed that the wound of the first section had failed to unite throughout the entire thickness of the wall; in fact, its site was marked merely by a recess covered by peritoneum and lined with decidua. Apparently, the muscular layer had never united at all, and Woyer believes that in spite of the uninterrupted course of the convalescence after the first operation, the wound had consolidated badly. He considers it a strained hypothesis that would explain the rupture by the growth of the decidua into the scar during the later stages of pregnancy. The latter, if true, would introduce a new and hitherto undreamt of danger to the Cæsarean operator.

J. H. Targett,[28] in 1900, showed a specimen of rupture of the uterus following Cæsarean section before the London Obstetrical Society. In this case there was some discussion as to the exact site of the tear.

At the same meeting P. Horrocks related another instance of rupture following Cæsarean section.

Everke[29] reported a case in which at the first operation the uterus had been sutured with silk. Rupture occurred through the scar.

A. L. Galabin[30] mentions another instance. Seven days before admission the patient was attacked with sudden pains and collapse, and signs of internal hæmorrhage, at the full term of preg-

nancy. At the previous Cæsarean section the tubes had been tied with fishing gut.

In my tables there are four cases in which the wall of the uterus was 'thinned':

Case 12, at the fourth operation (thickness 3 mm.).

Case 25, at the second operation.

Case 29, at the second operation (so thin that pressure of thumb caused the wall to give way).

Case 41, at the second operation.

In three cases rupture appeared imminent at the time of operation: Cases 4, 34, 35; in each instance at the third operation. In Case 23 there appeared at each operation a remarkable 'subperitoneal blood effusion,' situated at the lower end of the uterine scar. F. G. H. Birnbaum attributed it to the occurrence of tearing, but does not state whether he found that actual tearing had taken place. L. Winckel[31], in 1849, described a case in which at the second section he found on the wall of the uterus around the old scar a number of 'considerable grape-like varicosities.' Stolz[32] of Strasburg, at a second section, found on each side of the scar a cyst of the size of a fist. In all probability the subperitoneal blood effusion was due to subperitoneal rupture of varicose veins, and was not dependent upon commencing rupture of the uterus.

G. Woyer (*loc. cit.*) mentions another case which shows how even a thinned uterine wall can withstand the tension produced by labour pains. In this case a Cæsarean section had been performed by C. von Braun five years previously. The following labour had lasted for eighteen hours before the patient was brought into the clinic. By that time the child was dead, and therefore embryotomy was carried out. After extraction, Woyer took the opportunity to introduce his hand into the uterus in order to examine the scar. The lower two-thirds of it were well consolidated, but the upper third was represented by a depression 1½ cm. in length and 1 cm. deep. By bimanual examination the thickness of the wall at this point was estimated to be 3 to 4 mm.

Utero-parietal fistulæ occurred in four cases:

Case 7, after the first operation; persisted. Utero-parietal adhesion was almost complete at the subsequent section.

Class 11, after the first operation; 'persisted for some time.'

Case 22, after second operation; persisted; always covered with a scab.

Case 45, after the second 'Fundalschnitt.' Operation to cure it proved fatal.

These cases only emphasize the fact that suture of the uterus, despite the vast improvement in its technique, requires the utmost care in its execution. Probably even now too few, rather than too many, sutures are used.

## Conclusions.

1. The mortality of the repeated operation is 6·45 per cent.—four deaths out of sixty-two cases; or, including the death after the repeated 'Fundalschnitt,' 7·93 per cent. It is a question whether the fatal result in the latter case can be justly attributed to the section, since it is quite within the bounds of possibility that the fistula might have healed up had it been left alone.

2. The fertility of women who recover is not impaired.

3. In three-fourths of these patients more or less extensive adhesions are found at subsequent Cæsarean sections. Complete utero-parietal adhesion renders such repetitions exceedingly simple and easy. Most other forms of adhesion introduce difficulty and danger into the operation.

4. All Cæsarean sections should be performed with a view to ulterior pregnancy.

5. This can be done by the adoption of means to ensure complete utero-parietal adhesion.

It is not within the scope of this paper to discuss the relative merits of the three procedures previously mentioned as being open to choice for the delivery of the possessor of a deformed pelvis. It has been my aim to show that in such a woman the conservative operation is justifiable, since its repetition can be made with a comparatively small mortality—a mortality, be it noted, found only in the class of cases in which undesirable utero-visceral adhesions had been formed.

To Michaelis, Sinclair, and Spencer belongs the credit of recognising the condition which diminishes the risks of the operation by rendering its performance extraperitoneal. The next step consisted in the adoption of measures to ensure the formation of utero-parietal adhesion. This has been done by Professor Sinclair of Manchester, and to him belongs the distinction both of establishing the principle and of being the first to apply it clinically.

Other operators have endeavoured to bring about utero-parietal adhesion, but in no case with a view to ulterior pregnancy, the aim being solely to obtain adhesion sufficient to prevent leakage from the uterus into the peritoneal cavity.

## TABLE A.

### Division I.—Cases of Complete Utero-Parietal Adhesion.

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 1 | Mrs. A. S., 28, 4 ft. high; three craniotomies; 'brimmed pelvis.' | First, Dec. 16, 1886, A. H. F. Biggar (Cleveland, O.). | No details. | R. | L. | *Medical Record*, 1892, vol. xli., p. 538 (reported by Haggart). |
| | | Second, Feb. 16, 1892, A. H. F. Biggar. | 'The old operation had resulted in the adhesion of the entire uterine length to the abdominal wall.' The question of sterilizing the patient had been entertained, but it was impossible to carry the idea into execution, 'on account of the most intimate adhesions of the abdominal parietes to the entire length of the uterus.' | R. | L. | |
| 2 | Ida S., 23; pelvis plana rachitica; cv. = $5\frac{3}{4}$ cm. 1. Perforation of dead child. | First, March 9, 1892, Olshausen (Berlin). | After extraction inversion of uterus was induced; placenta peeled off; retro-placental hæmatoma found; inversion of uterus reduced, and uterine wound closed with catgut, abdominal wall with silk. | R. | L. | F. Hinschius, 'Ueber Sectio Cæsarea conservativa bei engem Pelvis,' Inaug. Diss., 1898, Berlin, pp. 23, 25; also R. Olshausen, *Zeitschr. f. Geburtsh. u. Gynäk.*, bd. xxxvii., hft. 3. |
| | | Second, Aug. 8, 1893, Olshausen. | Abdominal incision close to old scar. 'Some thin adhesions between uterus and abdominal wall, and also between uterus, omentum, and abdominal wall, partly peeled off, partly divided.' Uterus rolled out; no trace of old incision on it, peritoneal coat being quite smooth; incision followed by free bleeding, controlled by digital pressure; uterus sutured with catgut, abdominal wall with silk. On discharge from hospital uterus found adherent to abdominal wall. | R. | L. | |
| | | Third, March 1, 1897, Olshausen. | Abdominal incision to left of both old scars. 'Uterus adherent to the anterior abdominal wall by the whole of its anterior surface; adhesions close, broad, and pretty vascular; they are partly peeled off, a broad band on the right requiring ligaturing and dividing.' Uterus rolled out; no trace of old incisions; median fundal incision; manual compression; atony; free hæmorrhage. | R. | L. | |

TABLE A. DIVISION I.—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 3 | Mrs. A., 1-para, 25; left hip ankylosed; extreme lordosis; cv.= 2 in.; abortion between first and second sections. | First, April 10, 1896, W. J. Sinclair (Manchester). | Uterine wound closed with deep silk and superficial catgut sutures. | R. | L. | The *Lancet*, Jan. 19, 1901. |
| | | Second, Aug. 22, 1901, W. J. Sinclair. | Before operation there were evidences of utero-parietal adhesion. On cutting through the cicatrix 'the incision was found to extend at once into the muscular wall of the uterus, so that the uterine cavity was entered without opening the peritoneal cavity.' When the sutures were being introduced 'anæsthetic vomiting took place, and caused a slight tearing upwards of the wound, so that it extended a short distance into the peritoneal cavity; this was closed.' | R. | L. | *Trans. North of England Obstet. and Gynæcol. Soc.*, 1901, p. 65; and private communication kindly made by Professor Sinclair. |

DIVISION II.—UTERO-PARIETAL ADHESION ALL BUT COMPLETE.

| | | | | | | |
|---|---|---|---|---|---|---|
| 4 | Therese S., 29, 3-para; flat, rachitic pelvis, with general contractions; cv.=6½ to 6¾ cm. 1. Cephalotripsy. 2. Cephalotripsy. Aborted at third month in third pregnancy. | First, March 3, 1886, Leopold (Dresden). | Uterus sutured with eight strong silver wire sutures and eighteen superficial interrupted fine silk sutures. | R. | L. | *Arch. f. Gynäk.*, 1886, bd. xxviii., p. 112. |
| | | Second, Sept. 9, 1887, Korn (Dresden). | Incision to right of old scar; uterus adherent all along line of suture to abdominal wall; its own wall thinned; deep and superficial catgut sutures (chromicized). | R. | L. | *Centralbl. f. Gynäk.*, 1888, p. 11; Leopold, 'Der Kaiserschnitt,' 1888, p. 133. |
| | | Third, June 27, 1891, Leopold (Dresden). | 'Uterus bound by adhesions to omentum and abdominal parietes; its walls very thin, one part of cicatrix being transparent, so that a rupture would soon have occurred; no trace of chromic catgut; uterine scar excised; deep and superficial silk sutures.' | R. | L. | *Arbeiten aus der Königlichen Frauenklinik*, Dresden, 1893, bd. i., pp. 302, 308, and 318. |
| 5 | Emily K., 28, 3-para; pelvis plana rachitica; cv.=7·5 cm. | First, April 16, 1891, Olshausen (Berlin). | No details. | R. | L. | F. Hinschius, 'Ueber Sectio Cæsarea conservativa bei engem Becken,' Inaug. Diss., Berlin, 1898, pp. 22, 24, 29. |

TABLE A. DIVISION II.—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 5—*continued.* | Emily K.—*continued.*<br>1. Forceps; child dead.<br>2. Version; forceps to after-coming head; child dead. | Second, Feb. 17, 1893, Olshausen. | Abdominal incision close to old scar; numerous firm broad adhesions united the anterior surface of the uterus to the parietal peritoneum of the anterior abdominal wall; P.P.C.; free bleeding; uterus sutured with catgut; raw surface, 3 cm. long, on left border of uterus, due to separation of adhesions, sewn up. | R. | L. | R. Olshausen, *Zeitschr. f. Geburtsch. u. Gynäk.*, bd. xxxvii., hft. 3. |
| | | Third, Sept. 7, 1895, Olshausen. | Abdominal incision close to old scar. 'The whole anterior surface of the uterus was united by firm adhesions to the abdominal wall, so that the uterus was first visible after extensive division of the adhesions with scissors.' 'The divided adhesions did not bleed; one omental adhesion was ligatured.' The peritoneal cavity was shut off by adhesions entirely, except at the upper and lower angles of the wound, before the separation of the adhesions; uterus sutured with catgut. On discharge uterus lay high up and was adherent. | R. | L. | |
| 6 | —<br>'Narrow pelvis.' | First, ? | No details obtainable. | ? | ? | *Monatsschr. f. Geburtsh. u. Gynäk.*, 1897, bd. vi., p. 45. |
| | | Second, ? | No details obtainable. | ? | ? | |
| | | Third, Jan. 11, 1897, Carl Everke (Bochum). | 'Operation almost entirely extra-peritoneal, only about 2 cm. of peritoneum being opened, so extensive were the adhesions.' | ? | ? | |
| 7 | —— 20; generally contracted pelvis.<br>1. Embryotomy. | First, June 16, 1895, J. C. McCoy (Paterson, N.J.). | Uterus closed with deep silk, superficial catgut sutures, silkworm-gut for abdominal wall; utero-abdominal fistula formed in lower angle of wound, through this menstrual blood escaped; all discharge ceased in Feb., 1898, on supervention of pregnancy; P.P.C. | R. | L. | *Amer. Journ. Obstet.*, 1899, vol. xl., p. 508. |

TABLE A. Division II.—*continued.*

| Number of Case. | Name and Age of Patient: Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| *7—continued.* | —— —*continued.* | Second, Nov. 12, 1898, J. C. McCoy. | Abdominal incision to right of old scar; following conditions found: (1) 'At site of sinus uterus firmly adherent to abdominal wall over a space of 2½ in.' (2) 'On either side of the old scar, in the anterior wall of the uterus, were bands of adhesions extending along the entire length of the organ and across its cervical portion; the adhesions completely surrounded the field of operation, save at the fundus of the uterus, where they were deficient; uniting as they did the anterior surface of the uterus to the parietal peritoneum, they made the operative field practically extra-peritoneal.' (3) 'The cicatricial tissue about the sinus in the uterus extended over an area 1½ in. in diameter.' P.P.C. By packing the deficient space above with gauze, the operation was rendered practically extra-peritoneal; uterus closed with deep interrupted silk sutures; both ovaries and tubes were then removed. | R. | L. | |
| 8 | F. W., 2?, dwarf; cv. = 2½ in. | First, Aug. 2, 1893, H. R. Spencer (London). | | | | |
| | | Second, July 28, 1894, H. R. Spencer. | 'Adhesions to omentum and cæcum.' | | | |
| | | Third, April 3, 1900, H. R. Spencer. | Performed under eucaine (local) anæsthesia. 'Owing to the adhesion of the uterus to the abdominal wall, resulting from the previous operations, the peritoneum was only slightly opened at the upper and left part of the incision.' | R. | L. | *Journ. of Obstet. and Gynæcol. of British Empire*, 1902, p. 138. For further details of this case I am indebted to Dr. Spencer, who kindly conveyed them to me in a private communication. |

## TABLE B.

### Cases of Incomplete Utero-Parietal Adhesion.

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 9 | Frau P. Schär; generally contracted, flattened pelvis; cv. =7'5 cm.; four perforations; one premature induction. | First, June 22, 1887, Zweifel (Leipzig). | Uterus sutured with nine deep and seventeen superficial chromicized catgut sutures. | R. | L. | *Archiv f. Gynäk*, bd. xxxi., p. 209. |
| | | Second, Dec. 17, 1888, Zweifel. | Abdominal incision in old scar; intestine adherent to abdominal wall; omentum to latter and to uterus; with one exception requiring ligature and division; all adhesions separated by finger; the lower part of the uterus was then found directly adherent to the abdominal wall; uterus closed by seven deep silk sutures and a superficial continuous layer of juniper catgut. | R. | L. | *Archiv f. Gynäk.*, 1890, bd. xxxvii., p. 67; *Centralbl. f. Gynäk.*, 1889, p. 226. |
| 10 | Frau Lachmann, 28, 4-para; rachitic pelvis; cv. =6¾ cm.<br>1. Perforation.<br>2. Perforation.<br>3. Small, feeble child born alive; died later. | First, March 14, 1886, Leopold (Dresden). | Uterus sutured with eight deep silver and twenty superficial, silk sutures; on discharge from hospital uterus ascertained adherent to abdominal wall. | R. | L. | *Archiv f. Gynäk.*, 1886, bd. xxviii., p. 115; *Arbeiten aus der Königlichen Frauenklinik*, Dresden, 1893, bd. i., pp. 302, 316. |
| | | Second, June 15, 1891, Leopold (Dresden). | Abdomen opened to left of old incision; uterus strongly adherent to abdominal wall and mesentery; the adhesions had to be partly ligated and divided before it was possible to turn the uterus out of the abdomen; drainage with iodoform gauze required on account of ragged surfaces left after separating adhesions; on discharge from hospital uterus ascertained adherent to abdominal wall. | R. | L. | |
| 11 | —— 2-para; generally contracted, asymmetrical, funnel-shaped pelvis.<br>1. Craniotomy. | First, 1883, Krassowski. | Uterus sutured in three layers with silk; peritonitis for first ten days; on discharge uterus immobile; anteflexed; in lower angle of wound was a fistula 6 in. in length, which persisted for some time after. | R. | L. | Alfred Frank, 'Casuistik von mehrfach an derselben Person vorgennomener Sectio Cæsarea,' Inaug. Diss., Freiburg, 1899, p. 25; also, Frommel, *Jahresberichte der Gynäk.*, 1892, p. 356. |
| | | Second, Oct. 31, 1891, Krassowski. | Uterus found adherent to abdominal wall, omentum, and bladder; those uniting the uterus to the first two were strong, and required division; uterus closed with silk sutures. | R. | L. | |

TABLE B—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 12 | Therese A. Barth, 32, 1 - para; rachitic flat pelvis, with general contraction; cv.= $6\frac{1}{2}$ cm. | First, Jan. 25, 1886, Schultze (Jena). | Five deep silver and five superficial silk sutures. | R. | L. | *Arch. f. Gynäk.*, 1886, bd. xxviii., p. 131. |
| | | Second, July 23, 1888, Schultze (Jena). | Abdomen incised in old cicatrix; removal of old silver sutures; uterus firmly adherent to abdominal wall, and below to bladder; omentum adherent to anterior wall; transverse colon adherent to abdominal wall above upper angle of wound; difficulty experienced in freeing adhesions, which were vascular, and required ligaturing and dividing, twenty-four minutes being occupied by this alone; uterus closed with deep and superficial silk sutures; on discharge uterus firmly adherent to lower end of abdominal scar, 'nevertheless, corpus uteri freely movable.' | R. | L. | *Arch. f. Gynäk.*, 1889, bd. xxxiv., p. 134. |
| | | Third, Aug. 14, 1890, Zweifel. | Abdominal incision to left of old scar; several adhesions between uterus, and intestines freed; no mention of any between uterus and abdominal wall; deep catgut and superficial silk sutures used to close uterus. | R. | L. | 'Kaiserschnitt nach der conservirenden Methode bei ein und derselben Person zum zweiten, dritten und vierten Male wiederholt,' P. Kwasniewski, Inaug. Diss., Jena, 1894. |
| | | Fourth, Feb. 22, 1893, Schultze (Jena). | Abdominal incision through extremely thin scar; numerous adhesions between uterus and abdominal wall below umbilicus; these did not bleed when separated; uterine cicatrix 1 cm. wide, 3 mm. thick; fibrous; uterus closed with silk. | R. | L. | Ditto. |
| 13 | Christine H., 27, 2 - gravida; generally contracted, flat pelvis; cv.= $6\frac{3}{4}$ cm. 1. Premature labour at seventh month. | First, 1891, G. Braun (Vienna). | | R. | ? | R. Braun v. Fernwald, 'Der Kaiserschnitt bei engem Becken,' Vienna, 1894, pp. 62, 63. |
| | | Second, June 29, 1892, G. Braun. | Omentum adherent in several places to parietal peritoneum; part resected; no note of utero-parietal adhesions, which, if present, did not interfere with the incision; uterus left in the abdomen undisturbed. | R. | L. | |

TABLE B—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 13—*continued.* | Christine H.—*continued.* | Third, July 15, 1893, Koffer (Vienna). | Omentum adherent both to abdominal and uterine walls; uterus dextro-rotated 90 degrees, and firmly held in that position by adhesions; omentum ligatured off, and uterus eventrated, but the application of the rubber tourniquet was rendered very difficult by intimate adhesions between lower segment of uterus, omentum, and abdominal parietes, especially on the right side, where it was impossible to separate the omentum, a piece of which, the size of the palm of the hand, was resected. Porro's operation. | R. | L. | |
| 14 | —— 25, 2-para; flattened pelvis; dense vaginal cicatrices resulting from injury in first labour prevented measurement of cv. 1. Craniotomy. | First, May 13, 1890, Rühle (Elberfeld). | Uterus closed with deep and superficial silk sutures; then the omentum was drawn over the anterior uterine surface; on tenth day abscess in lower angle of abdominal wound; P.P.C. | R. | L. | W. Rühle, 'Conservativer Kaiserschnitt und dreieinhalb Jahre später Operation nach Porro bei derselben Frau wegen Atresia vaginalis artificialis. |
| | | Second, Oct. 21, 1893, Rühle (Elberfeld). | Abdomen opened through old scar; a coil of intestine was adherent by one side with the uterus, and by the other with the abdominal scar; these adhesions were very vascular; two long adhesions passed from fundus to abdominal scar; also a broad-based one partly from fundus, partly from area on its left; this joined the thinnest part of the scar, a few mm. thick only, and much wider than the rest of its extent. Porro's operation. | R. | L. | J. F. Bergmann, Wiesbaden, 1894 (Separat-Abdruck aus der Festschrift zur Feier des 50-Jahrigen Jubiläums des Vereins der Aerzte des Reg.-Bez., Düsseldorf). |
| 15 | Frau L. F., 33, 1-para; rickety, flat pelvis; cv. = 4 cm. | First, July 7, 1886; doctor at patient's home. | No details given, except that 'numerous small abscesses' developed in the abdominal wall; afterwards a hernia appeared over the symphysis pubis. | R. | L. | A. Hofmann, 'Sechs Fälle von wiederholter Laparotomie bei derselben Personen,' Inaug. Diss., Giessen, 1894. |
| | | Second, April 10, 1894, Löhlein (Giessen). | Before operation there were ascertained: (1) presence of left ovary in fist-sized ventral hernia. (2) Adhesion of transverse colon to abdominal wall. Abdominal incision to right of old scar opened peritoneum at once; there was only one cord-like adhesion uniting uterus to abdominal wall, and rotating former on its long axis; there were some omental adhesions to the abdominal wall; left ovary lay as diagnosed. Porro's operation. | R. | L. | |

TABLE B—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 16 | Louise L., 26, 1-gravida; rachitic flat pelvis; cv. = about 6 cm. | First, Jan. 2, 1890, Löhlein (Giessen). | Uterus closed with three rows of catgut sutures. | R. | L. | Albert Hofmann, 'Sechs Fälle von wiederholter Laparotomie bei derselben Personen,' Inaug. Diss., Giessen, 1894. |
| | | Second, April 14, 1891, Löhlein. | Abdominal incision to left of scar; omentum adherent to upper angle of latter: easily peeled off, as were single strands of adhesions between uterus and abdominal wall; uterus closed with deep silk and superficial sutures. | R. | L. | H. Löhlein, *Verhandl. der deutsch. Gesellschaft für Gynäk.*, Sixth Congress, 1895, p. 675; H. Löhlein, *Gyn. Tagesfragen*, vol. i., p. 7. |
| | | Third, May 11, 1895, Löhlein. | Abdominal incision to right of first scar; in the neighbourhood of the former scars were fine adhesions, easily broken down, between uterus, omentum, and abdominal parietes; the uterine wall was markedly thinned, and the cicatrix appeared as a linear streak; on dismissal the uterus was adherent to the abdominal wall, but its mobility did not seem to be very much impaired; P.P.C. | R. | L. | |
| 17 | L. R., 28, 4-para; rachitic flat pelvis, with general contraction; cv. = (?)<br>1. Dead fœtus born spontaneously.<br>2. Dead fœtus delivered with 'instruments.'<br>3. Decapitation of dead fœtus. | First, Feb. 11, 1886, G. H. van der Meij (Amsterdam). | Uterus sutured with silk. 'Slight circumscribed peritonitis followed operation.' | R. | L. | *Nederland Tydschr. von Verlooskunde en Gyn.*, vol i. |
| | | Second, Sept. 25, 1888, G. H. van der Meij (Amsterdam). | Several strong adhesions between uterus and abdominal wall; no traces of old scar or of sutures; uterus sutured with silk. | R. | L. | Torggler, *Wiener Klinik*, 1890, hft. i., p. 15. |
| | | Third, Feb. 1, 1896, C. N. van de Poll (Amsterdam). | Abdominal incision 1 cm. from old scar; omentum adherent to upper part of abdominal scar; below, broad adhesions between uterus and abdominal wall. Porro's operation. Abdomen reopened same evening for bleeding from separated intestines. | R. | L. | *Centralbl. f. Gynäk.*, 1896, p. 554. |
| 18 | Mrs. C., 25, 1-para; scoliorachitic flat pelvis; cv. = $2\frac{3}{4}$ in. | First, Sept. 28, 1892, C. P. Noble (Philadelphia). | Uterus sutured with silk. | R. | L. | *Annals of Gynæcology and Pediatrics*, 1893. |

TABLE B—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 18—*continued.* | Mrs. C.—*continued.* | Second, Aug. 12, 1897, G. M. Boyd (Philadelphia). | Incision to one side of old abdominal scar. 'Several omental adhesions were now loosened; then it was found that the uterus and abdominal wall were firmly united at the lower angle of the old incision.' These adhesions were not separated. | R. | L. | *Amer. Journ. Obstet.*, 1898, vol. xxxvii., p. 322. |
| 19 | E. L., 23, 1-gravida; 'pelvic contraction.' 2. Induction of premature labour. | First, Nov. 23, 1887, Hegar (Freiburg). | Uterus closed with deep interrupted silk and superficial catgut sutures. | R. | L. | A. Frank, 'Casuistik von mehrfach an derselben Person vorgennommener Sectio Cæsarea,' Inaug. Diss., Freiburg, 1899. |
| | | Second, July 6, 1894, Sonntag (Freiburg). | Thin abdominal wall; no mention of adhesions; uterus closed with deep and superficial silk sutures. | R. | L. | |
| | | Third, Sept. 25, 1897, Bulius (Freiburg). | Abdominal wall 'right thin'; incised through old scar; with the opening of the peritoneum the lower part of the uterus was found adherent to the abdominal wall by broad adhesions; in the region of the umbilicus the omentum was adherent; latter was double ligatured and divided; some uterine adhesions were divided with scissors, and it was then found that the lower part of the uterus was but little developed, and was proportionately thin; the incision was therefore placed high up, beginning at fundus; uterus closed by deep and superficial silk sutures; Fallopian tubes were adherent to their respective ovaries; double removal. | R. | L. | |
| 20 | —— 40; flat, rachitic pelvis; cv. = 8½ cm. 1. Perforation. 2. ,, 3. ,, | First, Dec. 12, 1891, ? (Groningen). | Details lacking; apparently good recovery. | R. | ? | 'Een Geval van Sectio Cæsarea recidiva,' J. F. Selhorst, Groningen, 1900. |
| | | Second, June 10, 1899, J. F. Selhorst (Leeuwarden). | Abdominal incision to right of old scar; lower part of uterus adherent to parietes; above, several coils of small intestine adherent to parietes; gut wounded; small purulent collection containing sutures found on uterine wall; P.P.C. | R. | L. | |

TABLE B—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 21 | —— 29; dwarf. | First, Sept. 7, 1892, A. V. Johannovsky (Reichenberg). | Uterus sutured with silk; on discharge uterus ascertained adherent to abdominal wall. | R. | Died when three weeks old. | *Monatschr. f. Geburtsh. u. Gynäk.*, bd. xii., p. 326. |
| | | Second, June 5, 1900, A. V. Johannovsky (Reichenberg). | Abdominal incision a finger's breadth to right of scar; peritoneal cavity opened above umbilicus; extensive firm adhesions were at once encountered, for separation of which knife and scissors were required. | R. | L. | |
| 22 | —— pelvic deformity. | First, 1895. | | R. | | *Monatschr. f. Geburtsh. u. Gynäk.*, bd. xiii., p. 456. |
| | | Second, Sept. 14, 1897, Brünings (Munich). | Eight days after operation formation of abscess between uterus and abdominal wall; after this had healed there remained a shallow depression, sometimes moist, always covered with a scab. | R. | | |
| | | Third, Jan. 3, 1901, Gustav Wiener (Munich). | Uterus firmly adherent to abdominal wall, omentum, and intestines. Porro's operation. | R. | Dead when delivered. | |

## TABLE C.

CASES OF UTERO-VISCERAL OR PARIETO-VISCERAL ADHESION.

| | | | | | | |
|---|---|---|---|---|---|---|
| 23 | Frau Rittgen, 4 ft. 3 in. in height; rachitic pelvis, with oblique contraction; cv. = 3½ cm. 'Schaltwirbelbecken.' | First, 1875, Schlemmer and Vonderbank (Call). | No details. | R. | ? | *Archiv f. Gynäk.*, 1885, bd. xxv., p. 422. |
| | | Second, Feb. 16, 1878, F. G. H. Birnbaum (Cologne). | Abdominal incision at once exposed uterus lying free; omentum adherent to anterior abdominal wall; at lower part of uterine scar was a subperitoneal effusion of blood, indicative of some tearing of uterus; latter bled freely from veins when incised; hæmorrhage after delivery checked by ice placed *in utero*; four catgut sutures closed the 8·5 cm. uterine incision; drainage-tube placed in lower angle of abdominal wound. | R. | L. | |

TABLE C—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 23—*continued.* | Frau Rittgen—*continued.* | Third, 1879, Malmedy (Cologne). | No details obtainable. | ? | ? | |
| | | Fourth, Nov. 8, 1881, Birnbaum (Cologne). | Omentum adherent to whole length of abdominal scar; it required division; subperitoneal blood effusion found at lower angle of uterine cicatrix, as in the second operation; free bleeding during operation checked with ice; uterus closed with catgut. | R. | L. | |
| | | Fifth, March 31, 1884, Birnbaum (Cologne). | Subperitoneal blood effusion again present; omentum adherent to uterus; it was ligatured and divided; uterus closed with catgut. | Died; p.m., intestinal adhesions; uterine wound gaped in its centre; spleen softened. | L. | *Archiv f. Gynäk.*, 1886, bd. xxviii., pp. 252, 256 (Cases 12 and 20). |
| 24 | —— 37; 10-para; eight normal labours, ninth forceps; osteomalacia. | First, 1882, Birnbaum. | | R. | L. | *Archiv f. Gynäk.*, 1886, bd. xxviii., p. 256 (Case 21). |
| | | Second, 1884, Birnbaum. | A coil of intestine adherent to abdominal wall; placenta attached anteriorly; 'enormous hæmorrhage.' | Died from septic peritonitis. | L. | |
| 25 | —— Dwarf. | First, May, 1888. Second, May, 1890, Bejan (Roumania). | There were no adhesions between uterus and abdominal wall, but intestines were adherent to the uterus; the wall of the latter was thinned; the uterus was not sutured. | ? Died from general peritonitis | ? L. | *Bulletin de la Société des Médecins et Naturalistes de Jassy*, Jan., 1890, p. 7. |
| 26 | —— 1-para; pelvic deformity; cv. = 8·5 cm. | First, 1891, Staude (Hamburg). | Uterus closed by twenty silk sutures and a continuous catgut layer; placenta anterior. | R. | L. | *Deutsche med. Wochenschr.*, 1891, No. 41, p. 1149. |
| | | Second, July 2, 1893, Staude (Hamburg). | Omentum adherent to abdominal wall; uterus free, except for one long, slender adhesion passing from it to the abdominal wall; old scar showed as a smooth narrow streak; no trace of old sutures; uterus sutured with silk; P.P.C. | R. | L. | *Centralbl. f. Gyn.*, 1893, p. 782. |

TABLE C—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 27 | Barbara K., 29, 1-gravida; generally contracted, flat pelvis; cv. = 8 cm. | First, 1891, Schauta. | | R. | ? | R. Braun v. Fernwald, 'Der Kaiserschnitt bei engen Becken,' Vienna, 1894, p. 74. |
| | | Second, June 18, 1893, G. Braun (Vienna). | Peritoneum underlying old scar thickened; omentum adherent to uterus over area, the size of a crown-piece, ligatured and divided; no uterine adhesions; P.P.C. | | | |
| 28 | —— 32, 1-para; flattened pelvis, with oblique deformity and general contraction. | First, April 27, 1893, Schneider (Fulda). | Uterus closed with ten deep and twelve superficial catgut sutures; placenta lateral, right side. | R. | L. | *Centralbl. f. Gynäk.*, 1893, p. 1057. |
| | | Second, Sept. 6, 1894, Schneider (Fulda). | Uterus not adherent to abdominal wall, but omentum and intestines adherent to posterior uterine wall; these rendered eventration of uterus difficult, and application of rubber tourniquet impossible, manual compression was therefore resorted to; uterus closed with eight deep and ten superficial catgut sutures; scar tissue excised from abdominal wall, which was closed with silk; P.P.C. | R. | L. | *Centralbl. f. Gynäk.*, 1895, p. 97. |
| 29 | —— Report very incomplete. | First, Smyly (Dublin). | No details given. | ? | ? | *Dublin Journ. Med. Sci.*, 1895, vol. xcix., p. 270. |
| | | Second, Smyly (Dublin). | Operation was begun when daylight was fading, and had to be finished by lamplight; abdomen opened; uterus drawn out; intestines firmly adherent to the uterine scar; detached with difficulty; uterine cicatrix so thin that it gave way to pressure of thumb; the cicatricial margins did not offer sufficient raw surface to insure firm union, so they were split with scissors and united with alternate deep and superficial sutures. | Died on fourth day from peritonitis, due to a small opening in intestine, which had been overlooked. | L. | |
| 30 | A. K., 27, 1-para; generally contracted, flat pelvis; cv. = 7 to 7¼ cm. | First, April 29, 1890, Leopold (Dresden). | Uterus sutured with silk. | R. | L. | *Arbeit. aus d. kgl. Frauenkl.*, Dresden, bd. i., p. 314 (Case 31). |
| | | Second, Nov. 20, 1897, Leopold. | Diastasis of recti muscles; uterine wall thinned; firm adhesions with sigmoid flexure divided with Pacquelin's cautery; P.P.C. | R. | L. | *Arch. f. Gyn.*, 1898, bd. lvi., p. 14 (Case 70). |

TABLE C—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 31 | —— 20, 2-para; flattened, rachitic pelvis. 1. Version and craniotomy. | First, June 9, 1896, E. Pollak. | | R. | L. | *Centralbl. f. Gynäk.*, 1899, p. 401. |
| | | Second, June 25, 1897, E. Pollak. | Abdominal incision to left of scar; uterus not adherent; omentum adherent to uterus, especially on right; uterus sutured with seven deep and twelve superficial silk sutures. | R. | L. | |
| | | Third, Jan. 10, 1899, E. Pollak. | Abdominal incision through old scars; omentum adherent in several places to uterus; later closed with eight deep and ten superficial silk sutures. | R. | L. | |
| 32 | —— 26; contracted pelvis; sacrum alone deformed; cv. = 2 in. 1. Embryotomy. | First, Feb. 15, 1900, N. Raw (Liverpool). | Uterus closed with deep and superficial silk sutures. | | | *Trans. North of Eng. Obstet. and Gynæcol. Soc.*, 1902, p. 33. |
| | | Second, Nov. 13, 1901, N. Raw (Liverpool). | 'The uterus was not all adherent to the abdominal wall, although some bands of omentum were adherent to the scar.' P.P.C. | R. | L. | |

## TABLE D.

CASES OF FILAMENTOUS UTERO-PARIETAL ADHESION.

| | | | | | | |
|---|---|---|---|---|---|---|
| 33 | L. B. (*née* K.), 23, 1-para; pelvis plana rachitica; cv. = 5·75 cm. | First, Oct. 18, 1892, Olshausen (Berlin). | | R. | L. | F. Hinschius, 'Ueber Sectio Cæsarea conservativa bei engem Pelvis,' Inaug. Diss., Berlin, 1898, pp. 24, 28. |
| | | Second, March 26, 1895, Olshausen. | 'No important adhesions.' Incision encountered part of placenta. | R. | L. | |
| 34 | Rachitic, pseudo-osteomalacic pelvis; cv. = 8 cm. | First, July 6, 1893, Tarnier (Paris). | Uterus sutured with silk. | R. | L. | *Nouv. Archiv d'Obstét. et de Gynæcol.*, 1895, vol. x., p. 178. |
| | | Second, ? Tarnier. | Incompletely recorded; no trace on uterus of first operation, therefore presumably no adhesions. | R. | L. | *L'Obstétrique*, 1899, vol. iv., p. 193. I desire to express my indebtedness to Professor Paul Bar for his kindness in assisting me to verify the reference to this case. |
| | | Third, June 23, 1896, Paul Bar (Paris). | Incision in linea alba; numerous thin utero-parietal adhesions, easily broken down by the finger. | R. | L. | |

TABLE D—*continued*.

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 35 | —— 1-para; rachitic, pseudo-osteomalacic pelvis; cv.=7·5 cm. | First, May 2, 1894, Paul Bar (Paris). | Uterus sutured with silk. | R. | L. | *L'Obstétrique*, 1899, vol. iv., p. 193; also 'Leçons de Pathologie Obstétricale,' by Paul Bar, Paris, 1900, p. 13. |
| | | Second, June 16, 1896, Paul Bar. | Abdominal incision through linea alba; some weak adhesions separated by finger; uterus sutured with silk. | R. | L. | |
| | | Third, July 14, 1897, Tissier (Paris). | Uterine wall extremely thinned, threatening hernia of the ovum; adhesions very slight, and caused no difficulty. | R. | L. | |
| 36 | —— 29, dwarf; rachitic, flat pelvis; cv.=6·4 cm. | First, Oct. 27, 1887, Schauta (Prague). | Uterus closed with eleven deep silver wire and seventeen superficial silk sutures; on recovery uterus movable and not tender. | R. | ? | A. Frank, 'Casuistik von mehrfach an derselben Person vorgenommener Sectio Cæsarea,' Inaug. Diss., Freiburg, 1899, *Wiener med. Presse*, 1890, No. 26. |
| | | Second, April 4, 1890, Schauta. | Abdominal incision in old scar; uterine scar covered by a 'pseudo-membrane,' which spread out in a fan-shape to the scar of the anterior abdominal wall; this was divided; uterus closed with deep silver and superficial silk sutures. | R. | L. | |

## TABLE E.

CASES IN WHICH THERE WERE NO ADHESIONS.

| | | | | | | |
|---|---|---|---|---|---|---|
| 37 | Marie Kaiser, 28; flat pelvis; cv.=2 to 2¼ cm.; two abortions. | First, May 8, 1875, Lungren (Toledo, O.). | Liquor amnii drawn off before operation by a catheter introduced through cervix; P.P.C.; uterus sutured with silver wire; when the patient was dismissed it was freely movable. | R. | L. | *Amer. Jour. Obstet.*, 1881, vol. xiv., p. 78. |
| | | Second, May 22, 1880, Lungren. | No adhesions; Fallopian tubes tied 1 in. from the uterine end. | R. | L. | |

TABLE E—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 38 | Frau Stöpel, 36, 3-gravida; generally contracted, rickety, flat pelvis; cv. =7 cm. 1 and 2. Delivery of dead children. | First, Nov. 1, 1886, Korn (Dresden). | Uterus closed with deep and superficial catgut sutures; movable on dismissal. | R. | L. | *Arch. f. Gynäk.*, bd. xxx., p. 332; also *Verhandlungen der Deutschen Gesellschaft f. Gynäk.*, Fourth Congress, 1892, p. 376. |
| | | Second, June 25, 1888, Korn. | No note of operation, except that uterine cicatrix was perfectly smooth; suture with deep and superficial silk; movable on dismissal. | R. | L. | |
| | | Third, Sept. 22, 1890, Korn. | Uterus completely free from adhesions; silk sutures; seven months later uterus quite movable and free from adhesion. | R. | L. | A. Burkhardt, 'Sectio Cæsarea nach der conservierenden Methode bei ein und derselben Frau zum zweiten und dritten Male wiederholt,' Inaug. Diss., Jena, 1891. |
| 39 | Adele C., 25; non-rachitic dwarf; generally contracted pelvis. | First, Oct. 1, 1888, A. Crimail (Pontoise). | Uterus sutured with fils de Florence. | R. | Died ante-partum. | *Ann. de Gynécol. et d'Obstét.*, 1889, vol. xxxi., p. 272, and 1891, vol. xxxv., p. 372. |
| | | Second, Feb. 19, 1891, A. Crimail. | No trace of adhesions; uterine cicatrix very firm, and contained three of the sutures used at the first operation; double ligature and division of tubes 5 cm. from uterus; omentum placed apron-like in front of uterus. | R. | L. | |
| 40 | Frau Pilz (Pauline L.), 24, 1-gravida; rachitic pelvis. | First, May 30, 1886, Korn (Dresden). | Uterus closed with deep silver and superficial silk sutures. | R. | L. | *Arch. f. Gynäk.*, bd. xxx., p. 330; *Arbeiten aus der königlichen Frauenklinik in Dresden*, Leopold, bd. i., pp. 302, 316. |
| | | Second, April 29, 1891, Leopold (Dresden). | Uterus not adherent; removal of silver wire sutures used at first operation; resection of uterine scar. | R. | L. | |
| | | Third, Nov. 4, 1896, Leopold. | Adhesions not mentioned; uterus closed with silk sutures. | R. | L. | *Arch. f. Gynäk.*, 1898, bd. lvi., p. 10. |
| 41 | —— 36; spondylo-listhetic pelvis; cv. =7 to 7¼ cm. 1. Version. 2. Induction. 3. Induction. All children dead. 4. Abortion. 6. Induction at third month. | First, Dec. 3, 1895, R. v. Braun-Fernwald. | Uterus closed with two layers of silk sutures; P.P.C. | R. | L. | *Arch. f. Gynäk.*, bd. lii., p. 78; *Centralbl. f. Gynäk.*, 1898, p. 489. |
| | | Second, Jan. 7, 1898, R. v. Braun-Fernwald. | No adhesions; uterine wall thinned; silk sutures intact. Fundalschnitt, Porro's operation. | R. | Died next day. | |

TABLE E.—*continued.*

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 42 | —— Generally contracted pelvis. | First, June 20, 1895, Carl Everke (Bochum). | Uterus closed with deep and superficial silk sutures. | R. | Died ante-partum. | *Münchener med. Wochenschr.*, 1898, p. 661. |
| | | Second, March 29, 1898, C. Everke. | No adhesions between uterus and abdominal wall; uterus incised sagittally through fundus; atony; free hæmorrhage. Porro's operation. | R. | L. | |
| 43 | J. J., 27, m., 1-gravida; contraction of pelvis, dependent on hip-joint disease in childhood; cv. = 2 to 2½ cm. | First, April 6, 1901, A. J. Wallace (Liverpool). | Uterus closed with chromicized catgut sutures, deep and superficial. | R. | L. | *Liverpool Medico-Chirurg. Jour.*, September, 1902. |
| | | Second, April 16, 1902, A. J. Wallace. | Abdominal incision through old scar; adhesions were entirely absent; uterine cicatrix visible as a faint linear depression; thick and well consolidated; uterus closed with catgut, and the wound sewn to the abdominal parietes. | R. | L. | |

## TABLE F.

CASE OF POSTERIOR INCISION OF UTERUS.

| | | | | | | |
|---|---|---|---|---|---|---|
| 44 | Frau Y., 23, 1-para; generally contracted, flattened pelvis; cv. = 8·8 cm. | First, June 22, 1899, A. Sippel, Frankfort-am-M. | Uterus opened by posterior median incision; sutured with continuous catgut sutures; placenta attached to anterior wall. | R. | L. | *Arch. f. Gynäk.*, 1899, bd., lvii., p. 543. |
| | | Second, Sept. 11, 1899, E. Petersen, Frankfort-am-M. | Division of cord-like adhesion running to anterior parietes; similar adhesion united small intestine to scar on posterior wall; transverse fundal incision; uterus closed with continuous silk suture; P.P.C.; on dismissal from hospital abdominal scar three fingers' breadth above symphysis; to its lower third the fundus of the high-lying, anteflexed uterus was adherent. | R. | L. | *Centralbl. f. Gynäk.*, 1899, p. 1409. |

## TABLE G.

### Cases of Repeated Fundalschnitt.

| Number of Case. | Name and Age of Patient; Indication; Previous Labours. | Number and Date of Operation; Operator. | Notes on Operation. | Results. | | References. |
|---|---|---|---|---|---|---|
| | | | | Mother. | Child. | |
| 45 | A. E., 30; generally contracted, flat, rachitic pelvis; double promontory; cv. = 9 cm. 1. Perforation. | First, May 3, 1897, Fritsch (Bonn). | Eventration of uterus; fundalschnitt encountered placenta; on dismissal from hospital uterus anteflexed, lying in pelvis; not adherent. | R. | L. | H. Schroeder, *Monatsschr. f. Geburtsh. u. Gynäk.*, 1901, xiii., pp 31-33. |
| | | Second, Feb. 18, 1899, Fritsch (Bonn). | Abdominal incision to left of old, well-healed scar; omentum adherent to right of uterine scar and to fundus immediately behind; ligatured and divided; fundal scar well marked on right side only; after incision neither cicatricial tissues nor thinning of the wall could be demonstrated (*vide* paper for after-history); uterus on discharge from hospital fixed high up to abdominal wall; utero-parietal fistula. | R. | L. | |
| 46 | Frau M. D., 28, 1-gravida; rickety flat pelvis; cv. = $7\frac{1}{2}$ cm. | First, Jan. 12, 1898, R. Hlawacek (Vienna). | Fundalschnitt. Uterus closed with deep and superficial silk sutures, and dropped back into the abdomen; it was then discovered that two coils of small intestine were adherent to the serosa parietalis, above the upper angle of the abdominal incision. | R. | L. | H. Ludwig, *Centralblatt f. Gynäk.*, 1899, p. 801. |
| | | Second, June 9, 1899, H. Ludwig (Vienna). | Abdomen opened through old scar which was firm, and showed no signs of weakening; at upper end of incision omentum adherent to parietal peritoneum, and a small part of it to sites of silk sutures around hardly-recognisable uterine scar; all easily separated; Fundalschnitt repeated, placenta presenting through incision; uterine scar $1\frac{1}{2}$ cm. in thickness; well consolidated. | R. | L. | |

NOTE.—Through the courtesy of Dr. Eden, I am able to draw attention to another case of repeated Cæsarean section, a summary of which will be found among the obstetrical abstracts of the present number of the Journal.

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[12] *The same: Arbeit. a. d. kgl. Frkl.*, Bd. i., p. 298 (Case 1); *Arch. f. Gyn.*, 1898, Bd. lvi., p. 2 (Case 44).

[13] *The same: Arbeit. a. d. kgl. Frkl.*, Bd. i., p. 320 (Case 40); *Arch. f. Gyn.*, 1898, Bd. i., p. 4 (Case 47).

[14] *The same: Arch. f. Gyn.*, 1898, Bd. lvi., pp. 4, 20 (Cases I. 50; II. 21).

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[16] *The same: Arch. f. Gyn.*, 1898, Bd. lvi., p. 10 (Case 63).

[17] *The same: Ibid.*, 1898, Bd. lvi., p. 12 (Case 66).


### Cases of more or less Mythical Origin.

Sprengel, in his 'Geschichte der Chirurgie,' mentions several cases:

1 (Bd. l., p. 385). Sonnius, a physician at Bruges, operated seven times on his wife.

2 (*Ibid.*, p. 434). A ship-captain alleged that he was the sixth of seven sons, all of whom had been delivered by means of Cæsarean section. With the seventh child the patient died, because the doctor who had performed the previous operations was no longer alive.'

3. One, Jac. Robin, stated that he was the fifth son of a woman who had been delivered of all her children by Cæsarean section.

1. Rousset: 'Exsectio Fœtus Vivi,' etc., a Casp. Bauhini Latio reddita. Francof., 1601, Hist. i., p. 10. Original paper, entitled 'Hysterotomotokie,' published in 1581.

The wife of a certain Gothard, living in Mesnilium, a parish of Millyum, who was unable to bring forth in any other way, was delivered six times by Cæsarean section of always living children, after which Nicholas Guillet, the barber who performed the sections, died, and the woman died in her seventh pregnancy, as no one was able to perform the section.

2. RAYNAUD: 'De Ortu Infantum Contra Naturam,' Lugd., 1637, p. 61.

In the town of Auçois, in the Moorish quarter, there was lately a woman upon whom Cæsarean section had been carried out six times. The same thing happened to a woman in the state of St. Joannis Mauien Mauriansis, her name being Maupa.

3. *Ibid.*, p. 62.

It is related that a woman was three times delivered by Cæsarean section of living children.

4. TH. BARTHOLINUS: 'Histor. anatom. rar. Hagæ Com.,' 1654, Cent. ii., Hist. viii., p. 160.

The wife of a Parisian surgeon was delivered by Cæsarean section 'four times and more,' and 'no harm done.' 'Certainly this should be a convenient way, especially when the orifice of the uterus is too small and the fœtus is too weak, if immediately the operator is summoned whilst the strength of the puerperal woman is still maintained. That the operation can be performed without any danger is shown by the reasoning and the cases mentioned by Rousset and Raynaud.'

5. TITSINGS DIANA, 1750, p. 781. (Guenin: 'Histoire de Deux Opérations Cesariennes,' Paris, 1750.)

The case of a woman is mentioned who was seven times delivered by Cæsarean section. She died after the seventh operation.

The persistent recurrence of the number 'seven' suggests the legendary nature of these stories. Compare the seven stars of Ursa major, the seven sleepers, etc. See 'The Night of the Gods,' vol. ii., p. 931, by John O'Neill. David Nutt, 1897.

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# ON PARATUBAL HÆMATOCELE.*

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In 1893 Sänger† described, under the name 'solitary hæmatocele,' the encysted tumour-like hæmatocele possessing a fibrous wall *independent of the surrounding viscera*, which is now usually known under the name of 'peritubal hæmatocele' (*vide* Fig. 1).

In 1894 Taylor of Birmingham‡ independently described the same variety of hæmatocele, in which 'a complete cyst wall is formed from the clot, quite independent of the tube or ovary, or any other pelvic organ. The complete cyst wall forms a kind of bag or jug, and within the neck of this globose pitcher, so to speak, is the fimbriated end of the Fallopian tube, and the latter may be lightly drawn out of its enclosing sheath, showing its fimbriated end uninjured.'

Since peritubal hæmatocele was first described, many cases of it have been recorded. Its frequency is shown by the fact that, of fifty cases of incomplete tubal abortion described by Mandl and Schmit,§ twenty-eight were accompanied by peritubal hæmatocele. No doubt in the past many cases have been overlooked because the sac of the hæmatocele was mistaken for a distended portion of the tube. Owing to the smooth, almost polished appearance of the outer surface of the fibrous sac, and its comparative freedom in some cases from adhesions, it may very easily be taken for a structure covered by peritoneum.

Sänger found the capsule of a peritubal hæmatocele to consist entirely of fibrin infiltrated by leucocytes. He states that in the outer layers the leucocytes are spindle-shaped, while in the inner layers they are round. The drawing which he gives to illustrate the structure of the capsule is sufficient, I venture to think, to disprove his theory that the capsule consists of fibrin. It shows every stage in the organization of fibrous tissue from a round-celled infiltration of the outer layer of the blood-clot. The spindle-shaped cells in the outer layers are entirely unlike leucocytes; they are undoubtedly fibroblasts. Mandl and Schmit,‖ after an exhaustive examination of their cases by all available chemical, optical, and tinctorial tests,

* Read before the Obstetrical Society of London, November 5, 1902.
† Sänger, *Verh. d. deutschen Ges. für Gyn.*, 1893, p. 282.
‡ Taylor, *Med. Press and Circular*, July, 1894.
§ *Archiv für Gyn.*, 1898. ‖ *Loc. cit.*

came to the conclusion that the capsule consists, not of fibrin, but of fibrous tissue, and the point may be regarded as settled, though doubtless the innermost layers of the capsule consist partly of fibrin.

Sänger has stated* that all intraperitoneal hæmatoceles connected with the Fallopian tube are peritubal. To quote his own words in translation: 'In the first place every hæmatocele arising from tubal bleeding is peritubal; the open tube, itself filled with blood, runs into, and in its abdominal portion is enveloped by, the hæmatocele.'

This statement has not, so far as I know, been contradicted. Taylor recognises that rupture of the tube may occasionally give rise to a local intraperitoneal hæmatocele as distinct from a diffuse hæmorrhage, but he appears to regard all *encapsulated* (tumour-like) hæmatoceles as products of bleeding from the open abdominal ostium; at any rate, he does not describe any case of encapsulated hæmatocele resulting from tubal rupture. Thus, after giving a general description of a local intraperitoneal effusion of blood, and its enclosure by adherent viscera as the result of local peritonitis, he says:†

'The outer layer of the blood-clot consolidates into a more or less perfect sac, and in addition to the adhesions the blood becomes encapsulated by a limiting layer or outer coat derived from its own substance or tissue. Sometimes the hæmorrhage within the capsule ceases altogether; in process of time the adherent viscera become detached, and we may find a perfect sac remaining, closely fitted round the abdominal mouth of the Fallopian tube, blood being found within it. This, which I have described elsewhere, is known as encapsulated hæmatocele.'

The object of my paper is to show that tubal rupture may occasionally produce an encapsulated tumour-like hæmatocele, clasping the rupture in the tube as peritubal hæmatocele clasps the abdominal ostium. Such a hæmatocele does not surround the tube, and therefore cannot be called 'peritubal.' I have ventured to call it a 'paratubal' hæmatocele. The sac enclosing such a hæmatocele may be so definite as to be mistaken for a portion of the tube.

In the first place I must own that the paper is based on the very careful examination of a single specimen.

I have since found one other undoubted case in the literature, and two others which show transitional forms between peri- and para-tubal hæmatocele.

The specimen for whose detailed description I ask the indulgence of the society to-night is No. 2,480 in St. Thomas's Hospital Museum.

* *Loc. cit.*

† Taylor, 'Extra-uterine Pregnancy,' Lewis, 1899, p. 55.

The case was operated upon by Dr. Cullingworth, and to his courtesy and Mr. Shattock's I owe the opportunity of re-examining the specimen.

In the museum catalogue it is described as a sacculated hæmatosalpinx. Illustrations of the specimen will be found in Dr. Cullingworth's 'Clinical Illustrations of the Diseases of the Fallopian

FIG. 1A.—PARATUBAL HÆMATOCELE. SPECIMEN 2,480, ST. THOMAS'S MUSEUM.

1, Uterine end of tube; 2, lumen of tube, exposed by the section; 3, a bristle passing through the tube to emerge at the ostium; 4, cavity of hæmatocele. (Compare Fig. 5.)

*Reproduced by kind permission of the Author, and of Messrs. J. and A. Churchill, from Dr. Hubert Roberts' 'Outlines of Gynæcological Pathology,' 1901.*

Tubes,' Plate XI., Fig. 1; and on a larger scale in Dr. Hubert Roberts' 'Outlines of Gynæcological Pathology,' Fig. 43, p. 156.

The following is an abstract of the clinical account of the case:*

A. K., aged thirty-four, admitted May 14, 1892.
Three children by the first husband, the youngest born in 1883. After

* Cullingworth, 'Hæmatosalpinx,' *St. Thomas's Hospital Reports*, vol. xxi., p. 43.

six years' widowhood she married a second time in 1890, and was regular after her marriage until January, 1891, when she fell and hurt her elbow. Menstruation since irregular, at intervals of five to eight weeks; the flow scanty, and often only lasting one day.

Her last period ceased November 15, 1891. On February 3, 1892, after feeling unwell for three or four days, she had a sharp and sudden attack of hæmorrhage which lasted more or less from that time up to her admission—that is, for three months. The blood has sometimes been red, sometimes dark brown. For about eight weeks she remained entirely in bed; then after a fortnight's semi-invalidism she again took to her bed, and remained there until admission.

Pains like those of labour came on at irregular intervals, followed by an increased discharge of blood and subsequent relief. Between these attacks she was free from pain. No decidua was passed.

On admission her temperature was 99°.

Nothing abnormal was felt per abdomen. Under anæsthesia the uterus was found of normal length, and somewhat retroverted. In Douglas's pouch, adherent to and moving with the cervix, was a swelling of the breadth of two fingers, lying obliquely with its upper and outer extremity directed to the right. The swelling was soft, even, and elastic, and bulged the upper part of the posterior vaginal wall forwards. An impulse was conveyed from the fundus uteri to the cervix, but not to the swelling behind it. The right uterine appendages could not be felt in their normal situation. The left could be distinctly mapped out, and were normal.

The swelling was diagnosed as the right tube distended with blood, and adherent in Douglas's pouch, and the case was thought to be one of tubal gestation with apoplectic ovum.

The abdomen was opened on May 26. A smooth, oblong, soft swelling, surrounded by recent adhesions, and about equal in size to a pigeon's egg, was found in Douglas's pouch. On being separated and brought to the surface, it proved to be a distended portion of the right Fallopian tube, close to, but not actually involving, the fimbriated extremity, which was sufficiently patulous to admit a probe. The swelling was of a dirty yellowish-brown colour, and evidently contained altered blood-clot. The isthmus of the tube was of normal calibre, and on section was seen to contain a small quantity of brown material (altered blood) in its lumen. The tube was divided and removed. The ovary, being normal, was separated from its adhesions, but not removed. There was no free blood in the pelvic cavity. Recovery uninterrupted; discharged well on June 25.

The specimen was shown at the meeting of this society held in June, 1892.* A committee appointed to consider it returned what amounts to an open verdict. Their report is as follows:

'The specimen consists of the greater part of the right Fallopian tube, 7 cm. in length. Immediately above the abdominal end is an oval swelling the size of a pigeon's egg, which projects freely outwards. The ostium is patulous and surrounded by fimbriæ which are somewhat œdematous. The canal of the tube is not only pervious but dilated, so as to measure 5 cm. at its widest part. On section the oval swelling is found to be a cyst filled with apparently homogeneous clot. On clearing out this clot, which is partly

* *Trans. Obst. Soc.*, vol. xxxiv., p. 182.

adherent, the wall of the cyst appears simple, without any evidence of former loculi. No communication with the canal of the tube could be detected. There is a ragged hole immediately above the fimbriæ, apparently artificial.'

'On microscopic examination of the clot, no chorionic villi could be detected. The clot was intimately adherent to the wall of the cyst, and the epithelial investment of the mucous membrane did not exist.'

After quoting this report, Dr. Cullingworth in his book adds:

'This was in many respects a remarkable and obscure case. . . . The pouchlike dilatation in which the effused blood was found had, in a manner that at present seems quite inexplicable, apparently become shut off from the rest of the tube.'

Since Dr. Cullingworth evidently regards his explanation of the specimen as provisional only, I have the less hesitation in advancing the view that it is an encysted hæmatocele lying by the side of the tube.

A naked-eye examination of the specimen as now preserved shows the following additional details:

1. Half the original specimen cut in the plane of the broad ligament is now mounted in the museum.

The half of the blood-sac preserved is an almost perfect hemisphere. If the original sac was spherical, a strong argument is provided for believing that its shape is the result of internal fluid pressure.

2. There are no remains of adhesions present on the sac, so that those found at the operation must have been very soft and recent.

3. The surface of the sac, though quite smooth, lacks the polished appearance of the peritoneum-covered tube.

4. The tube where adherent to the sac is stretched out over its surface. If a piece of thin rubber tubing were stuck upon the surface of a half-distended rubber balloon, and if the balloon were now fully distended, the rubber tubing would be stretched in a similar fashion to the Fallopian tube in the specimen.

5. The tube is pervious in its whole extent, and no communication exists between its interior and that of the blood-sac. But a closer examination shows the presence of an obviously weak spot in the dividing wall between the cavity of the blood-sac and the lumen of the tube. This is not the ragged artificial tear mentioned in the committee's report. Microscopical examination proves this weak spot to be a healed rupture in the wall of the tube, filled in by young fibrous tissue containing small masses of altered blood.

6. The blood-clot within the sac is oldest and firmest in the centre. It has a concentric, coarsely laminated arrangement, almost like that of a healed aneurysm. The centre of the clot is formed by a uniform blood mass, pear-shaped in section, and with its narrow end directed towards the rupture in the tube. Its dimensions are ·8 by 1·5 cm. in section.

7. The wall of the blood-cyst is about 2 mm. thick; its diameter is about 3 cm. It is attached to the Fallopian tube along the free border of the tube away from the broad ligament, and quite close to the ostium.

Microscopical sections have been made across the largest diameter of the blood-cyst, including the part of the Fallopian tube adherent to it, and passing through the ostium. In order to preserve the naked-eye anatomical relations, the greater part of this piece was cut in one block about 1 inch in diameter, and special precautions were taken to ensure uniplanar sections, by embedding the slice on a curved surface corresponding to the curve described by the rocking-arm of the microtome used. Although nearly the whole circumference of the blood-sac was examined, neither epithelial lining nor endothelial covering was found.

No trace of ovarian tissue was seen.

The wall of the blood-sac is made up entirely of fibrous tissue; no muscle could be detected in it anywhere, even with the assistance of van Giesson's special stain. Mr. Shattock, after carefully examining my specimens, agrees that muscle is entirely absent from the sac wall. The peripheral fifth of its thickness is made up of rather loose fibrous tissue, infiltrated with round cells, but also containing between its bundles fair numbers of spindle-shaped fibroblasts. This layer also contains numerous small dark granules of altered blood. A close examination suggests that many of these are lying within the phagocytic cells.

The middle two-fifths of the thickness of the cyst wall is its oldest portion, and shows hyaline scantily-nucleated fibrous tissue, with a few round cells in it, and an occasional fibroblast.

The inner two-fifths of the wall is the most recent layer, and shows most externally young fibrous tissue with round-celled infiltration; most internally a layer of old blood-clot, with round-celled infiltration of the clot. There are many large round cells filled with altered blood granules throughout this layer.

These appearances point to a centripetal organization of fibrous tissue at the expense of the blood-clot, while at the same time the deposition of lymph upon the sac by the surrounding peritoneum is slowly increasing its thickness from without.

German authorities state that the outermost layer of the wall of encysted hæmatoceles is the oldest. In this case, as in one I examined last year, the old layer of the wall is covered externally by a thin layer of comparatively young tissue, and this I believe to be the general rule. In my opinion, the organization of the sac of an encysted hæmatocele does not proceed entirely from without inward, as is generally stated. Though it is true in the main that the organization of the wall is a centripetal process extending into the mass of blood-clot, yet at the same time a slower, centrifugal process of organization is adding externally to the thickness of the fibrous sac.

Opposite the place of rupture of the tube, the wall of the blood-sac is much thinner than elsewhere, and consists entirely of

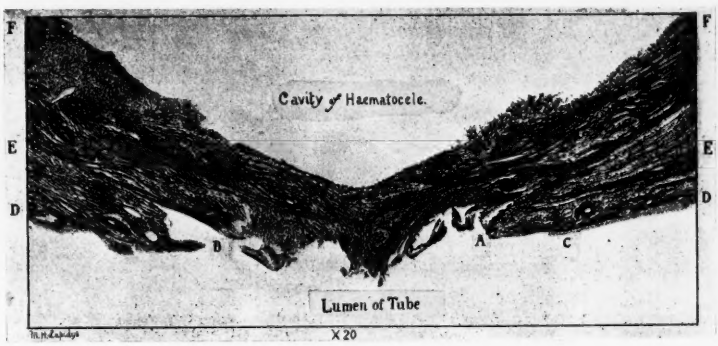


FIG. 1B.—SECTION ACROSS THE TUBAL RUPTURE. SPECIMEN 2,480, ST. THOMAS'S MUSEUM. × 10.

A, B, Edges of rupture in tube. At C, the epithelium leaves off as it approaches the edge of the rupture; D, E, represents the thickness of the wall of the tube; E, F, the thickness of the sac of the adherent hæmatocele. The rupture is filled in by young fibrous tissue containing small masses of altered blood.

young fibrous tissue containing microscopical masses of altered blood. This is evidently *the most recent portion* of the wall of the blood-sac.

The rent in the tube wall as it appears in the microscopical sections is 5 mm. wide. Its edges are clearly visible to the naked eye.

With the microscope it is seen that the epithelium of the tube has disappeared on either side of the rupture for some little distance. Further away from the rupture the epithelial layer is quite normal.

The edges of the rupture are thickly infiltrated with round cells. In some of the sections the edges have become slightly separated from the young tissue filling up the rent; in others they are con-

tinuous with it. The appearances clearly show that the rupture was not an accidental one made during the operation.

The wall of the tube near the rupture is very vascular, and some of the arteries have decidedly thickened walls. In the immediate neighbourhood of the rupture the wall of the tube is decidedly thinned, and the muscular layers of the tube cannot be clearly demonstrated; either they have undergone fibrous degeneration, or, as is more probable, they have been partially absorbed by chorionic villi which have subsequently disappeared. Distinct remnants of the muscle of the tube close to the rupture can, however, be demonstrated by van Giesson's stain as yellowish areas contrasting with the surrounding red-stained fibrous tissue. On the side of the tube away from the rupture the two layers of tubal muscle can be clearly seen.

Turning now to the question what was the original cause of the hæmorrhage, no fœtal structures could be demonstrated either in the tube, the blood-sac, or the clot. Dr. Cullingworth was, however, strongly of the opinion that the case was one of tubal gestation. The co-existence of a rupture in the tube with a patulous ostium and a patent lumen cannot be explained, so far as I am aware, by any known condition except tubal pregnancy.

The growing ovum no doubt ruptured the tube, and produced the hæmatocele by slow bleeding. The lumen, previously too narrow at the point of rupture to allow the ovum to pass towards the ostium, now offered no obstacle, and tubal abortion occurred. The ovum escaped into the peritoneal cavity and was doubtless absorbed. It is, of course, just possible that the ovum escaped through the rupture in the tube into the cavity of the hæmatocele. But the small size of the rupture and the absence of fœtal products in the blood-clot of the hæmatocele make this improbable. Besides, such a supposition fails to explain the dilated ostium.

The co-existence of tubal rupture with complete tubal abortion is a well-recognised occurrence. Mr. Bland-Sutton appears to have been the first to describe this combination of events. In 1892 he reported to the Medical Society of London a case in which a mole was found lying among the fimbriæ of the tube. There was a small rent in the tube wall. The position of the ovum and, as in the present case, the small size of the rupture, quite negatived the suggestion that the ovum had escaped through the rent in the tube.

It appears to me, then, that the evidence of tubal pregnancy, rupture, and complete tubal abortion, in Dr. Cullingworth's case is as strong as it can be without being conclusive. Complete tubal abor-

tion satisfactorily explains the entire absence of fœtal products from the specimen, the patulous ostium, and the dilated tube.

The question now arises whether the wall of the blood-sac represents either in whole or in part the wall of the tube. That it is not simply an altered and distended portion of the tube which has become shut off from the rest is certain, for the mucous membrane and muscle of the tube, only interrupted by the rupture, can be traced right along the dividing wall between the blood-sac and the tubal lumen. The edges of the rupture are sharply defined from, and do not pass into, the structure of the wall of the hæmatocele, and the tube is patent through its whole extent without any spur or stricture to indicate a kink. No trace of muscular layers, nor even the smallest isolated bit of muscular tissue, can be found in the wall of the hæmatocele.

Does, however, any part of the tubal wall, say, for instance, only the peritoneal layer, cover the blood-sac? In other words, was the first hæmorrhage an intramural one within the thickness of the tubal wall, and has it simply distended its original intramural cavity until it burst into the lumen of the tube? Dr. Cullingworth, in his paper on hæmatocele, already quoted, has described a case of intramural hæmorrhage from a ruptured vein in the wall of the Fallopian tube.

In the present case, however, the peritoneum can be traced as a continuous layer from the tube wall for only about 2 mm. on the wall of the blood-sac. It then definitely leaves off, and is replaced by a microscopically rough surface of fibrous tissue. The hæmatocele, then, is an intraperitoneal structure lying naked in the peritoneal cavity without any endothelial covering. No layer of the Fallopian tube can be traced into the wall of the hæmatocele in the angle where the two structures join. It follows of necessity from these facts that the wall of the tube can have taken no share whatever in the formation of the wall of the hæmatocele.

This conclusion is borne out by the exact similarity of structure between the wall of the hæmatocele in this case and the wall of the ordinary peritubal hæmatocele. In the latter form of hæmatocele the wall of the tube can by no possibility take any share in forming the hæmatocele wall, since the hæmatocele can be pulled apart from the tube, leaving the latter intact.

Turning now to the cases described in the literature, a series of connecting links can be traced, connecting typical peritubal hæmatocele with the typical paratubal hæmatocele just described.

In peritubal hæmatocele the tube generally contains a mole, and

the sac of the hæmatocele clasps the open ostium whence the bleeding proceeded (see Fig. 1).

Mandl and Schmit describe a case in which the mole-containing

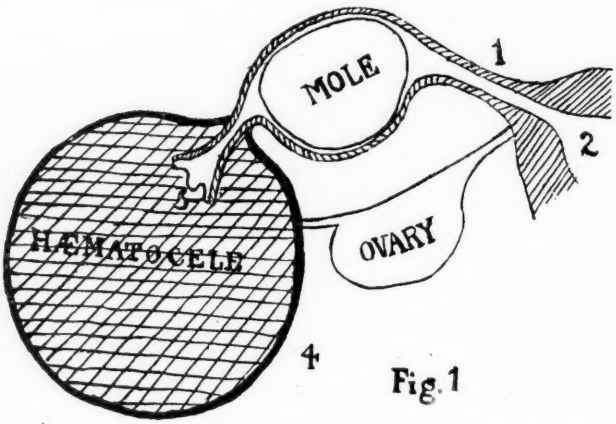


FIG. 1.—DIAGRAM OF A TYPICAL PERITUBAL HÆMATOCELE.

1, Fallopian tube; 2, cavity of uterus; 3, abdominal ostium; 4, sac of hæmatocele. (Figs. 1 and 5 show the typical varieties; Figs. 2, 3, 4, the intermediate forms.)

tube had ruptured; and an encysted hæmatocele enclosed within its cavity both the patent ostium and the rupture (Fig. 2). In this case, as they suggest, the blood in all probability came partly from

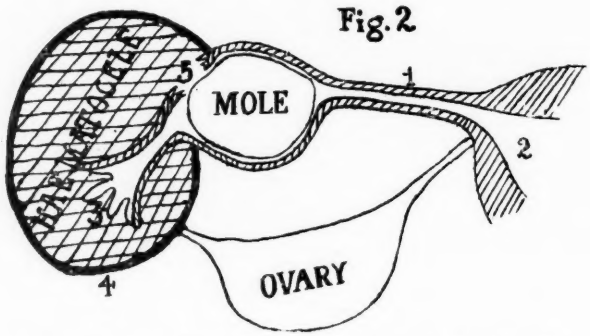


FIG. 2.—AN UNUSUAL FORM OF PERITUBAL HÆMATOCELE.

Rupture of the tube has occurred, and the sac includes within itself both the rupture and the patent ostium. 1, Fallopian tube; 2, cavity of uterus; 3, abdominal ostium; 4, sac of hæmatocele; 5, rupture in wall of tube.

the ostium, partly from the rupture. These two streams of blood united to form a single hæmatocele.

This is, then, a peritubal hæmatocele of an unusual variety, re-

presenting in its mode of origin a combination of para- and peri-tubal hæmatocele.

The next case to which I would direct your attention is on the border-line between para- and peri-tubal hæmatocele. It is also described by Mandl and Schmit. The mole-containing tube had ruptured, and round the rupture an encysted hæmatocele had formed. The portion of tube intervening between the mole and the occluded ostium was enclosed within the thickness of the sac wall of the hæmatocele. The case may evidently be classified either as peri-tubal or para-tubal (Fig. 3).

The third case described by Mandl and Schmit is a true para-tubal hæmatocele, the only one so far as I can find which has been

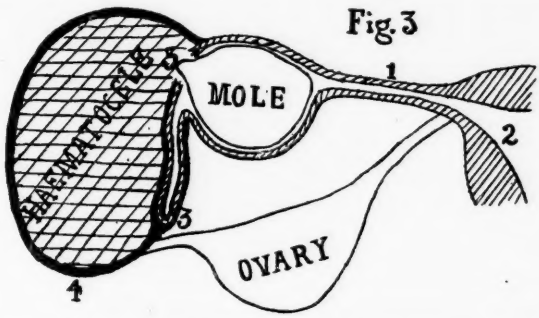


FIG. 3.—HÆMATOCELE WHICH MAY BE CLASSED EITHER AS PERI- OR PARA-TUBAL.

The bleeding has occurred from a rupture in the tube-wall. The portion of tube intervening between the rupture and the closed ostium is included in the thickness of the sac-wall of the hæmatocele. 1, Fallopian tube; 2, cavity of uterus; 3, closed ostium; 4, sac of hæmatocele; 5, rupture in wall of tube.

hitherto described, though no doubt the collective experience of this society will be able to furnish further examples of the condition.

In this case a mole-containing tube with occluded ostium had ruptured on its posterior surface. Round the rupture an encysted hæmatocele had formed, into whose cavity a portion of the mole projected. The Fallopian tube could be seen adherent to the anterior wall of the hæmatocele, which bore on its surface the closed ostium (Fig. 4). Here the hæmatocele did not surround any portion of the tube. To describe it as a peritubal hæmatocele would therefore be entirely misleading; it is para- and not peri-tubal.

Last in the series comes Dr. Cullingworth's case, which I have described to-night. In it the mole has escaped through the open ostium, and the hæmatocele is seen lying alongside the tube and adherent to it (Fig. 5), but not surrounding it.

This specimen is of particular interest, because it shows that the rupture of the gravid tube, with the formation of a paratubal hæma-

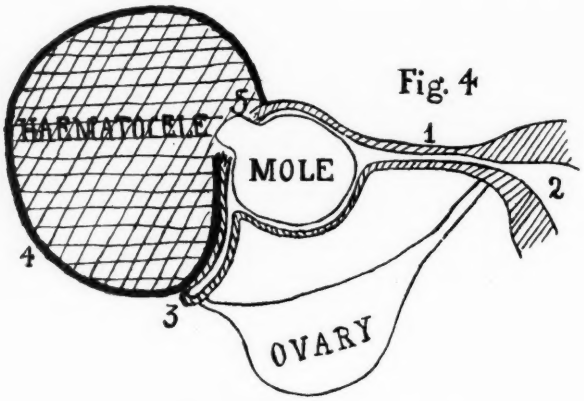


FIG. 4.—PARATUBAL HÆMATOCELE.

The sac does not surround any portion of the tube. Bleeding has occurred from a rupture. The portion of tube intervening between the rupture and the closed ostium lies *on the surface* of the sac of the hæmatocele. 1, Fallopian tube; 2, cavity of uterus; 3, closed ostium; 4, sac of hæmatocele; 5, rupture in wall of tube.

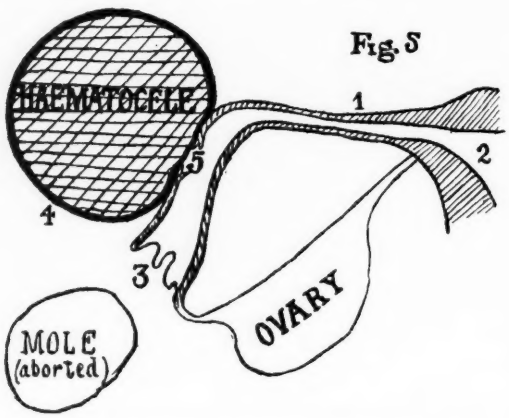


FIG. 5.—TYPICAL PARATUBAL HÆMATOCELE.

The sac does not surround any portion of the tube. Bleeding has occurred from a rupture. The ostium being patent, the mole has aborted, leaving the lumen of the tube free. The rupture has subsequently healed. 1, Fallopian tube; 2, cavity of uterus; 3, ostium; 4, sac of hæmatocele; 5, rupture in tube-wall (healed).

tocele round the rupture and with tubal abortion, is not necessarily inconsistent with the future functional activity of the tube. In peritubal hæmatocele, on the contrary, the tube is probably per-

manently occluded by a fibrous cap over the ostium even after the contained blood has been absorbed.

Although the natural course of events in the case under consideration was as favourable as it could possibly be, yet the symptoms of colicky pain and uterine hæmorrhage were none the less persistent, and laparotomy became necessary. The inference appears to be that all cases of tubal gestation in which these symptoms persist for more than a few days should be treated by surgical means, especially bearing in mind the risk of rupture of the hæmatocele.

Had it been desirable for any reason to preserve the tube in this case with a view to future pregnancies, it would have been as easy as in peritubal hæmatocele to dissect the hæmatocele from the tube, leaving the latter intact.

Into the dynamics, as opposed to the anatomy, of encysted hæmatoceles with independent sacs, I do not now propose to enter in detail. The prevailing opinion is that the bleeding is entirely antecedent to the formation of the sac wall. The laminated structure of the clot tends to show rather that the two processes were in the present case concurrent. The first-escaping central portion of the clot apparently became encysted by the peritoneum, and then shrank away from its cyst wall, allowing a peripheral zone of fresh hæmorrhage to occur between it and the cyst wall. This fresh hæmorrhage distended and enlarged the newly-formed cyst wall. The recently escaped blood in its turn clotted and contracted, allowing still further bleeding to occur into the peripheral part of the sac, which distended the latter still more.

It seems to me that only by repetitions of this process is it possible to account for the lamination of the clot, and the fact that its centre is the hardest and oldest portion. The small central pear-shaped portion of clot in all probability represents the primary hæmorrhage which preceded encystment.

The occurrence of aneurysmoid distension by blood-pressure of the sac of encapsulated hæmatoceles is conclusively shown by the not uncommon event of their rupture. In some cases, no doubt, the primary bleeding is a large one, the blood-clot within the hæmatocele is soft and non-laminated, and adjacent structures, *e.g.*, the ovary, may be included within the cavity of the hæmatocele, instead of being pushed aside by its gradual distension, as usually happens. But however small or large the original bleeding in cases of peri- and para-tubal hæmatoceles, it appears to me that in all such cases more or less aneurysmal distension takes place subsequent to the first

encystment, for otherwise it is impossible to explain the separation of the soft layer of plastic lymph round the mass of blood from the peritoneal surfaces, which throw it out in response to the irritative contact of the effused blood. As the layer of soft lymph or young fibrous tissue is stretched by the blood within it, some amount of separation must necessarily be brought about between the lymph and the adjoining visceral surfaces from which it was originally thrown out. Further distension is continually changing the relation of each point on the surface of the blood-sac to the surrounding viscera, and this constant change of relation is the determining factor in breaking down adhesions, in preventing the formation of fresh ones, and in smoothing and polishing the surface of the hæmatocele. It is, in fact, this which gives the hæmatocele its 'tumour-like' individuality. Where, on the contrary, the hæmorrhage is rapid at first, ceasing before a coherent layer of lymph has been thrown out around it, there is no force, except the feeble one of the intestinal movements, tending to separate the lymph from the peritoneal surfaces by which it has been thrown out, and the blood will simply be walled in by adherent viscera, and will possess no fibrous sac of its own. Such hæmatoceles are by definition excluded from peri- and para-tubal hæmatoceles, whose chief character is the possession of a non-visceral fibrous sac.

I have used the hybrid word 'paratubal' in the heading of my paper so as to follow the existing nomenclature as closely as possible.

Since, however, the most essential feature of both peri- and paratubal hæmatoceles—namely, the possession of a proper sac apart from the viscera—is a direct consequence of the hæmodynamic pressure within them, it would be better and simpler to include both varieties under the name of 'hæmodynamocele.'* The sacs containing pus or watery fluid occasionally found in similar relation to the Fallopian tube might be called pyo- and hydro-dynamoceles. Where the context indicated the nature of the contents, the short word 'dynamocele' would be sufficiently descriptive.

I cannot conclude without expressing my thanks to Mr. Shattock for his advice and assistance in the histological examination of the specimen, and to Dr. Cullingworth for the kind interest he has taken in my work.

I may add that Dr. Cullingworth has in the main accepted my conclusions, and has in the forthcoming edition of his work revised his description of the specimen in accordance with them.

* Handley, *Trans. Obst. Soc.*, 1901, p. 258.

## ABSTRACT OF QUOTED CASES.

MANDL AND SCHMIT, *Archiv für Gyn.*, vol. lvi., p. 456 (see Fig. 2).

Primipara, aged thirty-two, complains for six weeks of somewhat severe, almost continuous bleeding, which began with strong colicky pains which have somewhat subsided lately. A year previously supposed inflammation of the womb. No period of amenorrhœa.

There was right incomplete tubal abortion with rupture and hæmatocele round the tear. The left annexa swollen, and intimately adherent to the back of the uterus. Recovery after operation.

In the specimen obtained, the right tube, after a course of 5 cm., suddenly expands to a swelling the size of an apple, covered on its surface with coagulated black-brown blood. On its hinder wall the ovary is strongly adherent near the uterine part of the tube. The tumour consists, as a section shows, in its median part of a tubal gestation sac about the size of an egg, which contains a firmly adherent blood-mole. The rest of the tumour is formed by a hæmatocele sac which joins the outer side of the gestation sac, and communicates with it, so as to make a single cavity. The hæmatocele, which is filled with old coagulated blood, surrounds the tube completely in its further course, so that the fimbriated end comes to lie within the cavity of the hæmatocele. In the median part of the cavity (the part lined by tubal mucosa, which is bounded from the remaining part, that formed from the hæmatocele, by an irregular but definite line) one finds close to the rupture a round opening—the lumen of the tube—which, narrowing again after forming the tubal gestation sac, runs inwards and backwards within the sac of the hæmatocele to the ostium.

MANDL AND SCHMIT, *Archiv für Gyn.*, vol. lvi., p. 466 (see Fig. 3).

Patient aged thirty-five. Admitted October 28, 1893. Since the end of September, at the time of the expected period, bleeding of moderate amount, continuing to the present time. It was accompanied by pains in the left lower abdomen with smarting during micturition. Since the beginning of the illness frequent vomiting and fever. Some leucorrhœa. Three children, the youngest eleven years old. Last period end of August. There was left incomplete tubal abortion, with a hæmatocele round the place of rupture. The hæmatocele lay in front of the uterus. The right appendages were thickened and matted. Operation October 31. Recovery.

*Description of Specimen.*—A bluish tumour the size of two fists, lying in the utero-vesical fossa, with its front touching the bladder, its base touching the anterior surface and fundus of the uterus, while its upper part projects free into the general peritoneal cavity. The tumour consists of a sac about the size of an apple, with rather firm walls. It encloses most of the Fallopian tube, so that the latter is only visible for the first 4 cm. of its course from the uterus. At this point it widens out into a cavity the size of a nut, which contains old coagulated blood and a portion of a hæmorrhagic ovum, the size of a walnut. The greater part of the ovum projects through an opening on the anterior wall of the tubal sac, of irregular shape and about the size of a kreutzer, into the sac of the hæmatocele, which also contains much old coagulated blood. No embryo was found. The further portion of the tube runs outwards in the wall of the hæmatocele, and then turns suddenly round, so that the completely closed ostium comes to lie on the ovary, to which it is bound by soft adhesions.

MANDL AND SCHMIT, *Archiv für Gyn.*, vol. lvi., p. 480 (see Fig. 4).

A. G., aged twenty-nine; three children; abortion two years ago. Admitted October 7, 1896.

Severe spasmodic pains ushered in bleeding, which has lasted two months. The pains continue. Subjective symptoms of pregnancy. Last period six months ago.

There was left incomplete tubal abortion, an old rupture of the tube, and a hæmatocele round the rupture. Right appendages normal. Operation October 9. Recovery.

*Description of Specimen.*—The tube, normal in size for 5 cm. from its uterine end, then suddenly enlarges to the size of a hen's egg, and is found to contain a mole with amniotic cavity. The tube again narrows, and runs with a diameter of 2 cm. to the closed ostium. To the posterior surface of this tubal tumour a firm-walled blood-sac, the size of a fist, is firmly adherent. The hæmatocele thus bears on its surface the closed fimbriated end. On opening the sac, which contained much fluid and coagulated blood, it is found that about the middle of the tube is an opening about 1 cm. long, with irregular, torn, and blood-infiltrated edges. Through it parts of the mole project into the hæmatocele. Ovary of normal size, somewhat flattened by pressure, closely connected with the lower wall of the hæmatocele, but completely separable from it by dissection.

# FOURTH INTERNATIONAL CONGRESS OF GYNÆCOLOGISTS,

HELD AT ROME, SEPTEMBER 15 TO 21, 1902.

By W. J. SINCLAIR, M.D.

In the following paper no attempt is made to cover the whole of the work of the Congress. The account here given is intended to be partly professional and partly descriptive, but over the whole hangs the limit of space. The contributions selected for special notice are those which appeared to contain matter which was new, or which was stated in a fresh and attractive manner. Little attention has been paid to the mere official position of the contributors.

The Congress was remarkable for the long hours which it devoted to professional work; for the outrageous length of some of the addresses, to which no time limit was applied; for the absence of recreation and opportunities for the 'Congressists' meeting except in solemn debate; for the large number of members of all nationalities who stayed away in proportion to those who promised to attend; and for the crowding at the few fairly open functions caused by the admission of general practitioners from all parts of Italy.

Four subjects had been selected for discussion by the Congress, and they all created considerable interest and were fully discussed. Each subject was introduced by 'reporters,' whose contributions were put in printed form into the hands of the members. Some of these pamphlets were of inordinate length, and two, at least, assumed the dimensions of monographs which, as far as history and bibliography were concerned, left little more to be said.

The first subject was—

## The Medical Indications for the Artificial Interruption of Pregnancy.

The discussion was commenced with the Report of Hofmeier (Würzburg)—a model of concise and effective exposition. Hofmeier began with a reference to his own work of five-and-twenty years ago, in which he analyzed 137 cases, and found that, apart from eclampsia, 33 per cent. of the patients died after labour from nephritis alone, and that 60 per cent. of the children were lost. He also called attention to Fehling's repeatedly expressed opinion that nephritis is an essential cause of recurring death of the *fœtus in utero*.

When we try to answer the question, 'To what extent is nephritis an indication for the interruption of pregnancy?' we must have a clear conception of the amount of the danger, temporary or permanent, to the patient's life produced by nephritis. We must, therefore, clearly differentiate between chronic nephritis—that is to say, nephritis which existed before the pregnancy began—and the form of kidney trouble which began during the pregnancy, or resulted from it.

It is a well-known fact that the condition of a woman suffering from chronic nephritis is very unfavourably influenced by pregnancy. The explanation appears to be the disturbance of the equilibrium of compensation between heart and kidneys produced by pregnancy, and expressed by œdema, ascites, collections of fluid in the pleura, pericardium, etc. It appears also that the kidneys themselves undergo further degenerative changes, as shown in the rapid progress of the disease after labour. The danger of eclampsia in such cases is recognised to be comparatively slight, a fact which clearly points to the kidney disturbance as not being in the highest degree the cause of the convulsions. Our therapeutic measures must be directed to influencing the general health of the patient, and with this object in view we are called upon to interrupt pregnancy, even in the earlier months. The mortality from nephritis after confinement in the absence of eclampsia, viz., eleven deaths in thirty-three cases, in Hofmeier's experience, may be assumed to be too high an average, as the record refers to the severe cases which are sent to the suitable public hospitals. Still, it is certain that the mortality from chronic nephritis, when the balance of compensation is upset by pregnancy, is very high, and it appears to be higher in proportion as the symptoms of disturbance set in early.

The decision to interrupt pregnancy in such cases, even in the early months, is all the more easily arrived at from a consideration of the fœtal mortality. From 50 to 60 per cent. of the fœtuses either die in the uterus or are born so prematurely that they are absolutely lost.

Hofmeier's *first thesis* consequently assumes this form:

> *In chronic nephritis pregnancy should be interrupted artificially, in the interests of the mother, when, in spite of suitable treatment, the symptoms of the disease not only do not improve, but become worse.*

It is much more difficult to answer the question how we are to act in cases complicated with the so-called 'kidney of pregnancy,' first recognised and described by Leyden. Here it is of the greatest importance to decide the preliminary question, whether a chronic renal disturbance can precede the 'kidney of pregnancy.' Hofmeier holds the opinion that the nephritis is not the cause of the eclampsia, but that both nephritis and eclampsia are the expression of the existing intoxication. In any case, it is possible by exact examination into the amount of urine, its specific gravity, its sediment, etc., to form an estimate of the increased danger of eclampsia. In the presence of urgent symptoms this danger cannot always be evaded, inasmuch as the induction of labour requires time for its accomplishment; but it is best to rapidly empty the uterus, and so place the patient under the most favourable conditions.

The *second thesis* then becomes:

> *In the so-called 'kidney of pregnancy' (Schwangerschaftsniere), in view of the danger of eclampsia, artificial interruption of pregnancy (induction of premature labour) is indicated if, in spite of suitable dietetic treatment, the symptoms steadily become more serious.*

There is a third category of cases of acute nephritis occurring during pregnancy. The chief fact in the pathology is a partial arrest of metabolism, with a corresponding degree of toxæmia. The fœtus may die before the convulsions occur, or during the acute stage of the disease, or it may survive the maternal illness and be born alive at full term. The clinical symptoms of acute nephritis in pregnancy are those of a severe form of the 'kidney of pregnancy.' The former class of case is, however, alleged to differ from the typical case of pregnancy kidney, inasmuch as the symptoms come on more suddenly, and that the urine has the characters of acute inflammation, and is especially rendered remarkable by admixture with red blood-corpuscles. In fatal cases post-mortem examination reveals the appearances of acute inflammation in nephritis, whereas in pregnancy kidney such a condition is not discovered. All the symptoms in the case of acute nephritis may pass away without leaving any apparent consequences. The child may live to the normal end of pregnancy, or if it dies *in utero* premature labour comes on spontaneously. Hofmeier concludes that in the acute nephritis of pregnancy the danger to the patient lies essentially in the eclampsia, and inasmuch as the patient may recover, and the child does not necessarily perish, the artificial interruption of pregnancy hardly comes under consideration. It must be admitted, however, that Hofmeier hardly supplies sufficient clinical points to enable the physician to draw such a clear distinction between the categories of cases as to be of practical guidance in the treatment of any individual case.

Hofmeier's *third thesis* may be stated thus:

> *In the acute nephritis of pregnancy induction is not indicated, inasmuch as there is a possibility of recovery without permanent ill effects, and the induction of labour is of little efficacy in warding off attacks of eclampsia.*

Pinard (Paris) followed with an address, supplemented later by two speeches, which in the aggregate occupied fully an hour. In the hands of the members present the address took the form of a printed pamphlet of thirty-one pages. It may be stated as a simple matter of fact that the subject under discussion according to the heading of the *Rapport*, 'Des indications médicales à la provocation de l'accouchement,' was not reached before p. 25. It is no doubt interesting to read of the claims of Louise Bourgeois, 'accoucheuse de la reine Marie de Médicis,' to be considered the first to employ the induction of labour as a therapeutic agent, and still more interesting at a convenient season to read Pinard's personal opinions concerning the legal and ethical grounds for the induction of labour; it would also on a suitable occasion be instructive for medical students and young practitioners to hear from the master the *obstetrical* indications for the interruption of pregnancy. But assuming the subject to be the *medical* indications for the interruption of pregnancy, and that the listeners ought to have been the leading gynæcologists of Europe and America, Pinard's contribution need not occupy our attention for long.

He does not consider the incoercible sickness of pregnancy an indication for the interruption of pregnancy unless the pulse exceeds 100 per minute. He does not explain the reasons for fixing on this figure. The sickness is

merely a symptom of toxæmia, and should 'very frequently, if not always,' be made to disappear under suitable treatment. With regard to eclampsia, he does not think the need for the interruption of pregnancy has been sufficiently demonstrated if the circumstances are not exceptional. In heart affections every case must be judged by its own *physionomie spéciale*. In diseases of the urinary organs intervention is not indicated unless the quantity of urine falls below 800 to 1,000 grm. So the most serious question possible in such a case is settled on an arithmetical basis. Pyelo-nephritis may be aggravated by pregnancy. From the table showing the indications for the interruption of pregnancy—twenty cases in ten years—Pinard does not appear to have had a case of pyelo-nephritis. In diseases of the respiratory organs, even in advanced tuberculosis, Pinard sees no indication for the induction of labour. The function of the doctor is 'soigner la tuberculose et surveiller simplement la grossesse.' Of the 22,708 cases observed in ten years, pregnancy had to be interrupted on purely medical indications in eleven cases, in four of these with a fatal termination.

Rein (St. Petersburg) during thirteen years, out of 2,690 cases of pregnancy, induced labour thirty-seven times—that is to say, in 1·3 per cent. The indications were medical in only eleven cases. The most frequent indications for interruption of pregnancy are kidney and heart diseases. Induction is one of the most useful of the obstetric operations, and should be more frequently performed. Rein hints at thinking favourably of Cæsarean section in eclampsia occurring in primiparæ.

Schauta (Vienna) presented a *Referat* of sixty pages, of which his address was to some extent a summary. His conclusions ran to 104 heads. It would be impossible in the available space even to summarize these conclusions. Schauta took as the groundwork of his address the recorded cases in his own *Klinik* in Vienna, which amounted to 40,000. The cases were so numerous and presented so many examples of the complications of pregnancy that Schauta's report amounted almost to a complete gynæcological nosology, with remarks expressing his judgment on cases where interruption of pregnancy was indicated and where it was not indicated.

In severe cases of *polyneuritis gravidarum* induction of labour is indicated. Under this term he appears to include the cases of toxæmia of pregnancy, which was hardly otherwise mentioned during the whole discussion on interruption of pregnancy.

With regard to chorea, it is only in the most severe cases that labour should be induced, owing to the injurious influence of parturition on the patient's condition. An opinion is given regarding obstetric treatment in tetany, although no case has been recorded.

In certain skin diseases Schauta finds indications for the interruption of pregnancy, an opinion which will have the interest of freshness to many experienced and observant gynæcologists. Indications for abortion and premature labour are found in certain cases of pulmonary tuberculosis.

*Heart Diseases.*—Only one-seventh of the cases of disease of the heart are discovered during pregnancy. Spontaneous interruption of pregnancy

occurs in 20 per cent. of these. By means of appropriate treatment 95 per cent. of women suffering from disease of the heart go through pregnancy and parturition without serious consequences. Mitral stenosis is the most dangerous of the cardiac diseases to pregnant women. Injurious effects of pregnancy on the course of disease of the heart are very seldom observed. In mitral stenosis the first signs of failure in compensation indicate interruption of pregnancy.

*Hyperæmesis.*—There is no theory which explains all cases of hyperæmesis. Prognosis in hyperæmesis is more favourable than is commonly believed. Premature delivery is indicated in very rare cases when all other treatment has failed.

*Albuminuria and Nephritis.*—When the milk treatment does not produce improvement, pregnancy ought to be interrupted. If albuminuria appears in the first half of gestation and nephritis before the eighth month, interruption is indicated in the interests of the mother. In chronic nephritis interruption of pregnancy is indicated as soon as the fœtus is viable, or when the renal lesions give rise to serious general symptoms. Compare Hofmeier's views with those of Schauta.

*Eclampsia.*—No great value should be attached to the occurrence of nephritis and eclampsia in a previous pregnancy. In mild forms of eclampsia treatment by morphia and milk diet should be tried first. When the result is insufficient, when the attacks recur, and especially if coma supervenes, pregnancy should be interrupted.

*Diabetes.*—The prognosis in pregnancy is serious. In one-fourth of the cases the result is fatal. The fœtus gradually dies. Diabetes during pregnancy requires interruption.

*Osteomalacia* in pregnancy is discussed at considerable length, but the subject is of little practical interest to the English reader.

Schauta passes in review all the infectious and zymotic diseases without adding anything to the general knowledge. It may interest some readers to learn from him that 'hydrophobia, carbuncle, and glanders give no indication for the interruption of pregnancy.'

There is nothing new in his discussion of the benign and malignant tumours of the uterus in relation to pregnancy.

Simpson (Edinburgh) began by a reference to Denman's account of a consultation about the year 1756 among the most eminent medical men in London to consider the moral rectitude of, and the advantages which might be expected from, the practice of induction of labour. He also paid a graceful tribute to the memory of Porro, and referred to the association of Scotsmen with Italian Medicine. 'London furnished the subject for the first operation, Scotland produced the operator, and Italy inspired him.' No mention of Louise Bourgeois! Simpson divides the medical indications into fœtal and maternal. Among the first *habitual death of the fœtus* was mentioned for the first time in the discussion, and graphic details of a case were mentioned in illustration of the treatment. Emphasis was laid in his reply on the discussion on the need for the strictest investigation of every case, in order to ascertain the cause, and if possible to remove it. There was also an element of freshness introduced by the

consideration of *habitual large size of the child*, which is a medical or an obstetrical indication for premature labour according to the point from which the case has to be considered.

In speaking of *hyperæmesis gravidarum*, Simpson mentioned a case in his practice of a patient who lost her life after labour at full term, and he adds: 'But I have always had the conviction that her own life might have been spared had labour been brought on before the full time.' Most men of large experience have probably also such cases to record if they would be frank enough to do so. Humanity and practical common-sense appear to be on this point with Simpson rather than with some who are so conservative upon this indication, while recklessly extending the indications for interruptions in other directions.

On *gravidic nephritis* and in the complications of cardiac disease and albuminuria in pregnancy Simpson had nothing fresh to incorporate in his 'Report,' which he kept within the reasonable limits of an address introductory to a discussion.

It would be presumptuous, perhaps, and certainly unsatisfactory, to try in the available space to review the discussion of this subject. Reference has already been made to the absence of any except an incidental remark on the as yet mysterious cases of 'toxæmia' of pregnancy. In the treatment of cases, from that in which the patient only suffers great deterioration in general health without any diagnosable cause except the existence of pregnancy, to the case in which the patient becomes a fatuous wreck and is in danger of succumbing from an unknown disease, the medical profession might have expected some sort of opinion from the selected spokesmen of an international Congress of Obstetricians, giving some practical hint from their experience; but we search in vain through the long discussions for anything either theoretical or practical on this subject.

On a second point some remark is called for. The whole tendency of the discussion was to extend the boundaries or obscure the well-recognised lines within which interruption of pregnancy must be considered and legitimately adopted or rejected in the individual case. This may be very good and harmless work in the hands of the directors of great University hospitals for women, but upon the whole its influence on practice in general must be pernicious. It multiplies excuses for criminal interference, and obstetric philosophy becomes 'procuress to the Lords of Hell.' Zweifel's excellent criticism and protest both with regard to laxness in some directions, and to a dogmatic, didactic laying down of rules too stringent for private practice on the other hand, were just and timely; but mere spontaneous interposition in a debate does not carry with it the influence of the 'Report.'

### Hysterectomy in the Treatment of Puerperal Infection.

The introduction of the discussion of this second subject fell to Leopold, Treub, and Tuffier; the other 'reporters' were absent. As the subject is new and difficult, it may be the best course to set down here a rather full summary of the most striking and original reports, rather than small, and consequently less intelligible, portions of many speeches.

Treub (Amsterdam), after clearing the ground by eliminating the categories of cases published as hysterectomy on account of puerperal infection, but which were pathological conditions absolutely different, proceeds to discuss *hysterectomy in the treatment of acute genital infection in post-partum or post-abortum, accompanied with symptoms of toxi-infection without extra-uterine localizations clinically diagnosable.*

The first question which arises is whether the operation is a rational proceeding. The extinction of the primitive centre of infection may arrive too late on the one hand, but, on the other hand, there is a possibility that the organism may triumph over the septic microbes after the source of supply of pathogenic material has been cut off. The operative treatment in face of recorded facts must be considered a rational method.

Treub next remarks: Admitting that the operation is a rational method of treatment, is it justified (1) by the insufficiency of other means of treatment, or (2) by its own efficacy? With the treatment usually employed at the present time the mortality is 10 per cent. or less. Treub then analyzes 690 cases of severe puerperal infection from his hospital statistics. The cases include infection after abortion, and it appears incidentally that five out of eleven cases of criminal abortion ended fatally. Of the 690 cases, the result was fatal in thirty-four, but only six of these did not exhibit clinical signs of localization of the infection. Four of these cases could hardly have been considered suitable for operation by the most fervid supporters of hysterectomy. From these figures Treub considers the answer to his first question, as to the comparative sufficiency of our present methods of treatment, must be in favour of our ordinary methods. The question of the efficacy of hysterectomy can only be answered at present by an analytical review of all published cases. Accordingly, the clinical facts of thirty-six cases are concisely stated. In these there was neither extra-uterine localization nor such uterine complications as retention of placenta, sloughing fibroma, etc. Of these cases of hysterectomy fifteen recovered and twenty-one died. It would be easy to argue from these results that hysterectomy would in such cases diminish the mortality by a good third. But the reasoning would not be just. It is stated in the history of some of the cases mentioned that the operation was too long delayed. But in many cases, both of recovery and of fatal termination, the best possible judgment appears to have been exercised, and yet the question must always arise, Could the patient not have been saved without this mutilating operation? Treub, with characteristic frankness and honesty, proceeds to give the details of a case which he thought suitable for operation. The patient was admitted to the hospital eight days after labour, with a temperature of 104° and pulse of 144, the pyrexia dating from the second day of the puerperium. On attempting operation the uterine tissue was found to be so friable that, after trying for some time to make progress, during which the bladder was perforated, the operation was abandoned. 'Nine days after this abortive operation the woman was free from fever, and but for the vesical fistula . . . she would soon have been able to leave the hospital in perfect health.'

Perhaps the most useful contribution to the whole discussion on

hysterectomy in acute puerperal infection was Treub's answer to the question: What is the indication for hysterectomy under the conditions presented in the typical case? In order to answer this question, Treub passes under critical review the opinions and practice of several operators, and also the evidence obtained from bacteriology. Rochard (Paris) says: 'In every case of serious puerperal infection placing the life of the patient in danger, laparotomy should be performed.' Such a position is not justifiable either by the insufficiency of other measures nor by the results obtained from hysterectomy. Terrier (Paris) thinks it is only after an exact bacteriological examination of the blood and of the contents of the uterus that hysterectomy can be considered to be indicated. But Terrier, in the case referred to, did not examine the blood until after the operation, and then no microbes were discovered. Even if they had been found, the presence of the streptococcus in the blood is not a positive indication for hysterectomy, as maintained by Prochownick. Treub, in support of this contention, quotes the evidence of the researches of Petruschky, published in 1894, and he gives some details of a serious case of his own in which the blood contained both streptococcus and staphylococcus, and yet recovery was rapid and complete after the formation and evacuation of a parametric abscess. He then discusses the conclusions to be drawn from the fatal cases in which bacteriological examination of the blood gave a negative result.

Cartledge maintains that if the obstetrical treatment is to be successful it will arrest the malady in three days. No, says Treub, varying Pajot's dictum, 'La chirurgie n'est pas une affaire d'horlogerie.' Another contributor on this subject says: 'The thermometer and the finger on the pulse will always point out the right course.' No, says Treub, with great emphasis, the question is not so simple; the indication for hysterectomy can only be decided by taking into consideration the obstetrical treatment which has hitherto failed, and *all* the clinical signs which can be discovered by means of a rigorous observation continued as long as circumstances will permit. We cannot as yet lay down exact indications, and, after all, whether an operation is performed or not is often, as far as the doctor is concerned, a question of conscience and temperament.

Treub formulates his conclusions in the following propositions:

1. The ordinary methods of treatment of puerperal infection localized entirely in the uterus are sufficient in the great majority of cases.

2. In some exceptional cases hysterectomy may be successful when obstetrical treatment fails.

3. Hysterectomy ought never to be decided upon except after a thoroughly exact clinical examination, and a conscientious evaluation of every consideration for and against operation.

4. Whoever performs many hysterectomies in such cases certainly operates too much.

Tuffier (Paris) presented an admirable report, which ought to be carefully perused for its due appreciation. It would not be right to mutilate his views and misrepresent him in a condensed paragraph. Like all the surgeons, he is, perhaps, too much in favour of the abdominal

method of operation. 'To operate too soon would be criminal, too late futile.' The most difficult question in connection with the subject is, When is the best time to operate? In deprecating controversy, Tuffier makes an appeal for co-operation in scientific observation by the surgeons and accoucheurs, instead of the repetition to satiety of—'You surgeons kill the patient we could cure.' 'You accoucheurs let die the patients we could save.' A little less polemic and a little more scientific work appears to him to be necessary.

As a rule, it serves little purpose to quote the *obiter dicta* of those who take part under a strict time limit in such a debate as that under consideration. An exception may be made in the case of La Torre (Rome), who mentioned concisely some remarkable and encouraging facts. He is strongly in favour of curettage repeated as often as may be considered necessary. In one case he employed the curette fifteen times, and the patient did well in the end. In other four cases he operated from four to six times until the temperature fell, and the result was in each case satisfactory. La Torre considers hysterectomy the last refuge of all.

From this discussion it was apparent that the trend of opinion among gynæcologists was against hysterectomy in acute puerperal disease. There appeared to be a reluctance to condemn it altogether as perhaps unscientific, but the general opinion was in favour of further pioneer work being left largely to the experienced workers in the best public hospitals for lying-in women. There was, perhaps, the nearest approach to a formal condemnation of operating, except within narrow limits, of which such an assembly is capable.

### Tuberculosis of the Female Genital Organs.

The third subject for discussion was introduced by Martin (Greifswald), who treated the subject in a thoroughly exhaustive fashion. He discussed the etiology, pathology, diagnosis, prognosis of tuberculosis of the female sexual organs in general, and of the vulva, vagina, uterus, tubes, and ovaries in particular. Martin founded his statements on twenty-four cases which came under his own observation. It would be difficult, however, to select any individual passages in his address where anything is clearly a recent contribution to our knowledge of the subject, or, indeed, is stated in such a way as to arrest attention.

The contributions of Faure (Paris) and J. A. Amann (Munich), who followed Martin, contained little beyond the usual information contained in text-books, with this difference, that the authorities for opinions set down were often stated at considerably greater length. Amann's address was really a monograph on the subject. His only statement which seems worthy of special attention here is his calling in question the existence of primary tubercular disease of the female sexual organs by direct infection. The so-called cohabitation tuberculosis, which is usually attributed to direct infection from the husband, is more likely to be produced by some of the generally recognised channels, as, for example, by the respiratory tract.

The address of J. Veit (Leyden) on the subject under discussion was perhaps one of the most valuable contributions to the proceedings of the

Congress, and its value was still further enhanced by a weighty chapter on Tubercular Peritonitis. There is here, unfortunately, only space for his conclusions.

1. Tuberculosis of the female genital organs is of more frequent occurrence than is usually supposed.

2. There is certainly a primary form of tuberculosis of the genitals, but the secondary form is the most common.

3. The origin of tuberculosis of the genitals has usually a descending course, rarely an ascending one. Nevertheless, the affection may appear by way of the bloodvessels or lymphatics owing to accidental lesions.

4. The diagnosis of tuberculosis of the genitals must be established when possible by means of microscopical investigation, proving the presence of the tubercle bacillus. Sometimes the discovery of tubercles only may be sufficient for diagnosis.

5. In tuberculosis of the genitals recovery may take place spontaneously.

6. Up to the present time the best treatment of primary or isolated tuberculous disease of the genitals has been radical operation.

7. The treatment of secondary forms of tuberculosis consists principally in attention to the general state of health, and in the means employed in the sanatorium; yet in some cases radical operation gives good and permanent results.

8. Iodoform takes the first place in palliative and local treatment.

Conclusions with Regard to Tubercular Peritonitis.

1. Tubercular peritonitis is always secondary. We distinguish two forms—the ascitic and the adhesive.

2. The lesion of the genital organs may be primary or secondary, or the disease may be limited exclusively to the serous linings of the genital organs.

3. Peritonitis with widely distributed nodules, which do not originate in ovarian tumours and are not cancerous, ought to be considered tubercular.

4. In tubercular peritonitis spontaneous cure may occur, but this is very seldom the case.

5. Tubercular peritonitis may be cured by abdominal section. Want of success depends in the majority of cases of failure upon advanced tubercular disease in other organs.

6. We do not as yet know of any generally accepted explanation of recovery after abdominal section. It is a plausible suggestion that in these cases the normal serum becomes an antitoxin.

7. From the therapeutic point of view recent cases may be operated upon as soon as symptoms are manifested; but in such cases the possible necessity for repetition of the operation should be kept in view.

8. In chronic cases kept under observation, if no signs of spontaneous cure appear, operation should be resorted to.

9. The operation consists in abdominal section along the linea alba, clearing out all fluid, and closing the abdominal cavity. In cases complicated by local tuberculosis of the genital organs, a radical operation may be necessary.

Gutierrez (Madrid) gave an account of some good original work of his own, and expressed an opinion strongly in favour of frequent occurrence of primary tuberculosis of the genitals. The ascitic form of tubercular peritonitis gives a much more favourable post-operation prognosis than the plastic form.

O. v. Franqué (Würzberg), Fargas (Barcelona), Theilhaber (Munich), and Gottschalk (Berlin), contributed to the importance and interest of the discussion.

The fourth subject for discussion was—

**The Surgical Treatment of Carcinoma of the Uterus.**

In general terms the discussion might be described as a field-day for the gynæcological surgeons who take extreme views in favour of the extended operation by abdominal section. Cullen (Baltimore) was so moderate in his views that he would still resort to vaginal hysterectomy in very stout women. At the extreme of the gamut was Jonnesco (Bucharest). He presented an exhaustive monograph on hysterectomy for cancer, and by means of thirty-three coloured wall-maps he demonstrated the operations performed by himself and most other gynæcologists. Jonnesco showed by his pictures how he could in the course of his operations split the mesorectum and mesentery, and extirpate the retroperitoneal lymph glands as high as the fifth and sixth lumbar vertebræ, and even as high as the renal vein. And then he assured his audience that the best operation for cancer of the uterus was that which permitted of the removal of the uterus and its appendages, of the cellular tissue, and of the vessels and lymphatics of the pelvic, iliac, and inferior lumbar regions. He characterized this operation as 'rational, possible, benign, easy, and efficacious.' He did not claim relative safety, and he gave no figures.

Wertheim's laurels as the most 'advanced' operator are in danger. He supplied the usual historic retrospect of abdominal operations, and exact details of his own most recent modifications. He claimed to have no more than a primary mortality of 13 per cent., or, reckoning his first results, 20 per cent. Wertheim found lymphatic invasion in the pelvis and lumbar region in 31·5 per cent. of his cases, Jonnesco in 61·5. This discrepancy among the advocates of the most extreme proceedings on the chief anatomical point in justification of the operations must arouse misgivings, to use the mildest term, in the minds of cautious and humane gynæcologists.

Then in the matter of primary mortality, Wertheim placed it at 13 per cent., whereas Pozzi (Paris) in the same discussion, in a careful and judicial address, put the mortality in France and everywhere else as very nearly 34 per cent. Pozzi still advocated vaginal hysterectomy.

Owing to the inordinate length of the introductions to the discussion of the four special subjects, nearly all the individual contributions not bearing on these were crowded out; hence, probably, the barrenness of the Congress in original material.

# REVIEW OF CURRENT LITERATURE

## OBSTETRICS.

**Post-partum Hæmorrhage and its Treatment.**—A discussion on this important subject at the Berlin Society for Midwifery and Gynæcology on April 11 was opened by a paper by MAX HENKEL (*Zeitsch. für Geburts. und Gynäk.*, Bd. 47, pp. 197, 490). In the paper attention was first drawn to the fact, which was generally recognised in the discussion, that in certain cases of bleeding from the body of the uterus after labour, Dührssen's method of plugging with iodoform gauze is not efficacious in stopping the hæmorrhage. It appears likely that in some of these cases the blood has lost its property of coagulation, so that even when the uterus is well contracted the loss of blood still goes on, and it is even probable that, in proportion to the amount of blood lost in some cases, the power of coagulation gradually diminishes. The importance of this property of the blood for the permanent cessation of hæmorrhage is perhaps not, as a rule, sufficiently insisted upon. In applying massage to the uterus in the treatment of post-partum hæmorrhage, it should be remembered that too strong pressure and rubbing may dislodge from the mouths of the vessels clots that have already formed, and that bleeding may be in this way started afresh by the very means employed for its prevention. Henkel believes that, in the case of placenta prævia, post-partum hæmorrhage is due not so often to lacerations of the cervix as to defective coagulation depending upon the repeated losses during pregnancy and labour, which lead to watery condition of the blood, with deficiency in fibrin.

The treatment of post-partum hæmorrhage is, in the first place, preventive, and consists in the correct management of labour in all its stages. When hæmorrhage occurs after labour it is due, leaving out of consideration the blood condition just referred to, either to atony of the uterus or to lacerations of the cervix. As a temporary means of stopping hæmorrhage, while other means of treatment are being prepared, compression of the abdominal aorta should be borne in mind. Henkel first draws the uterus upwards out of the pelvis and drags it to the right with one hand, while with the other he compresses the aorta, which can easily be felt pulsating a little distance above the sacral promontory; gentle massage to promote contraction is carried out by the hand which is used for compressing the uterus. The compression of the aorta is easily kept up, and is well borne by the patient for a time not exceeding ten minutes. The

effect, as regards the prevention of bleeding, is immediate and complete. As another very efficacious method of temporarily controlling the bleeding, Fritsch's method was recommended by Bokelman and others. This consists in firmly pressing the vulva, which is at the same time pushed inwards towards the vagina with one hand, while the other squeezes the uterus downwards into the pelvis, so that the whole genitalia are strongly compressed between the two hands. This method is not objectionable from the point of view of asepsis, and is certain, only it is necessary sometimes to keep up the compression from fifteen to twenty minutes. In those cases where difficulty is met with in expelling the placenta by Credé's method it was generally agreed that before proceeding to manual removal through the vagina an attempt should be made under anæsthesia to express the placenta, a proceeding that is then frequently successful.

In the treatment of hæmorrhage from atony of the uterus, it appeared to be generally agreed that packing with iodoform gauze not only failed in some cases to prevent hæmorrhage, but had the disadvantage that sepsis might be set up by its use. As a matter of fact, it is hardly to be expected that treatment by this method can have any conspicuous advantage over the treatment by hot-water injection, since both methods depend for their success on the same factor—viz., on the power of the uterine muscle to contract when stimulated. In the worst cases of hæmorrhage the uterus has lost this power, and neither method can be expected to succeed. There remains the possibility of success by calling into action the other natural means of stopping uterine hæmorrhage, by causing in some way the formation of clots in the open mouths of the bleeding vessels, and it is strange that no mention of such means was made in the discussion under consideration. Such clotting can be brought about by the injection of strong solution of perchloride of iron into the uterus, as recommended by Barnes. The method obviously entails great dangers of sepsis, but it is possible that some other, and less objectionable, fluid may be found which will be equally efficacious with the iron solution; indeed, adrenalin solution may be such a fluid, although we are not aware that it has yet been employed in the treatment of post-partum hæmorrhage. At any rate, the important fact is that in the injection of styptic fluids is to be found a means of saving some of the worst cases of impending death from post-partum hæmorrhage.

The treatment of hæmorrhage from lacerations of the cervix received full attention in Henkel's paper and the subsequent discussion. The consensus of opinion seemed to be that suture of the cervix is not a safe method of treatment in the worst cases of bleeding from this cause, because of the difficulty or even impossibility of passing the sutures high enough, and because of the con-

siderable degree of skill necessary, and the time required for the application of the sutures. Opitz had seen four autopsies on women dead of such hæmorrhage where sutures had been employed, and in two of them the ureter had been caught in the suture and tied. More than one speaker had seen the lower part of a large laceration of the cervix sutured, and the patient had nevertheless bled to death from the upper portion which had escaped suture. As the best method of treatment in most of these cases, gauze plugging found favour with most of those who took part in the discussion. A notable method of treatment, not difficult of application, was recommended by Henkel. Both lips of the cervix are caught in a strong volsella, and the uterus is drawn well down to the vulva; this traction, as usually in the performance of vaginal hysterectomy, suffices during its continuance to prevent hæmorrhage. The cervix is then well drawn over to the side opposite to the laceration, and a volsella is applied high up on the base of the broad ligament in a direction at right angles to the axis of the uterus, its points just including some of the periphery of the cervix. The cervix is then drawn over to the other side, and a volsella similarly placed on the connective tissue at the base of the other broad ligament. The volsella on the cervix is then removed; the other two are left for twelve to eighteen hours, or even somewhat longer. When the cervix is well drawn down the attached portion of the connective tissue at the base of the broad ligament is drawn down with it, so that the volsella is placed well up and compresses the uterine vessels, or at least some of their largest branches. Henkel admits that it is possible that the ureter may be at the same time compressed, and possibly a portion of the bladder; indeed, he admits that he has twice seen the urine bloody after the employment of this method, but the blood cleared up in a few days, and the small openings made by the fine teeth of the volsellæ are not likely to give serious trouble. This method has been employed by Henkel in five cases of bleeding from lacerated cervix after abortion and after full-term delivery, and once in atony of the uterus, in all cases with success; he has had no opportunity to apply it in a case of complete rupture of the cervix with intra-peritoneal bleeding. In the discussion Koblanck added two successful cases, in which he had employed the same method. Among the other points emphasized in this interesting discussion was the futility of employing subcutaneous and other injections of salt solution to restore the patient before the hæmorrhage has been definitely stopped.

AHLFELD (*Zeitsch. für Geburts. u. Gynäk.*, Bd. 47, p. 224) records an important case of death from post-partum hæmorrhage, where the cause appeared to be the deficient coagulability of the blood. The patient, aged twenty-nine, was delivered at about the thirty-second

week of the fourth pregnancy; the first three pregnancies had ended at the sixth, seventh, and fifth month respectively. After the fourth delivery bleeding occurred, and continued in spite of massage of the uterus, hot douching with 50 per cent. spirit, and firm packing of the uterus with 10 metres of iodoform gauze; the patient died three hours after delivery, after losing nearly four pints of blood. The treatment adopted was successful in bringing about contraction of the uterus, although it did not stop the bleeding. At the autopsy some free blood was found in the peritoneal cavity, which seemed to have come from the congested and œdematous left Fallopian tube; the left ovarian vein was filled by a soft thrombus; there was no retention of membranes or placenta, and no laceration of the genital tract. A careful examination of the blood was undertaken by Professor Schenck, who found that it was watery, contained a markedly small percentage of solid constituents, and was deficient in fibrinogen; on the addition of fibrinogen the blood clotted in the usual way. Information was obtained from the husband that there was no evidence of hæmophilia in the woman's family, and that she herself had never suffered remarkably from loss of blood. This case appears to lend support to the view that, in a certain number of cases of post-partum hæmorrhage, the cause of the bleeding is to be found, not in atony of the uterus, but in the peculiar deficient coagulability of the blood. In the present case no attempt at treatment by injection of a styptic into the uterus was tried.

T. W.

**Retroversion of the Gravid Uterus, and its Surgical Treatment** (J. A. DOLÉRIS: *La Gynécologie*, June and October, 1902).—Retroversion of the uterus, even if complicated by the presence of peritoneal adhesions, does not prevent the occurrence of conception. Frequently, however, abortion occurs in the early months before the uterus has become incarcerated in the pelvis. Sterility is almost the rule in the so-called congenital retroversion, but it is very different in retroversion occurring after a full-term delivery or miscarriage. In these cases conception readily occurs, only too often to be followed by abortion.

Various methods have been adopted for the reduction of the displacement if the pregnant uterus becomes incarcerated in the pelvis, and in the great majority of cases these measures are successful. Exceptionally the reduction is prevented by the presence of strong adhesions or false membranes roofing over the uterus at the brim of the pelvis, or by the swelling of the incarcerated uterus, which may be also covered by recent soft adhesions. Pinard and Varnier in 1887 first drew attention to these cases, and showed the gravity of the condition. Vesical complications, especially gangrenous or membranous cystitis, not uncommonly occur, and lead to

a fatal result. Under these circumstances it has been proposed to induce abortion, a procedure however, which is very liable to be followed by septic infection. Pinard first suggested laparotomy as a suitable treatment, and related four cases in which this was carried out as the only means of saving the life of the patients. This operation should not be too long postponed, as if cystitis has occurred, general septic infection is much to be feared.

Doléris in this paper records in detail three cases in which he found it necessary to perform laparotomy for irreducible incarceration of the gravid uterus.

*Case* 1.—Multipara, aged thirty-six years. The patient had been treated for retroflexion during several years by massage and pessaries. She was admitted to hospital suffering from great abdominal pain, obstinate constipation, and difficult micturition. The uterus was completely retroflexed, and this was accompanied by some degree of prolapse. She had missed two periods. Various methods of reduction were tried and persevered in for a fortnight, but without avail. The symptoms were not relieved, and uterine contractions, with colicky pain, indicating threatening abortion, were observed. Abdominal section was performed. The uterus was readily raised up; the appendages were prolapsed and covered by soft adhesions. The uterus was now brought well forward, but still tended to fall backwards. The round ligaments were therefore shortened by the author's method (*vide infra*). The patient made a rapid recovery, and was delivered of a child at term.

*Case* 2.—Multipara, aged twenty-nine. This patient had previously suffered from ectopic gestation, and the appendages on the left side had been removed. Fifteen months later she was again admitted to hospital, suffering from pelvic pain. The uterus was found to be retroflexed and gravid (three months); anteriorly a cystic swelling of the right appendages was made out. The patient was kept under observation, and the usual methods of reduction were attempted, but without avail. The uterus, however, was not absolutely fixed. Laparotomy was performed. The uterus was bound down in the pelvis by a firm band in the region of the former operation on the left appendages. Numerous soft adhesions were present in the pelvis. These were easily separated. The cystic right ovary was now removed. The uterus was brought forward and the round ligaments shortened. The patient recovered rapidly, and was delivered of a living child at term.

*Case* 3. — Primipara, aged thirty-six years. She had always suffered from pelvic pain and scanty menstruation. When three months pregnant she felt, whilst exerting herself, 'something fall in the abdomen.' This was followed by retention of urine. On examination, the cervix was situated high above the pubes, and the

uterus lay almost vertically retroverted, the fundus pressing against the perineum. All attempts at reduction by manipulation failed. Three days later the abdomen was opened. The fundus of the uterus was delivered with some difficulty by firm traction on the cornua and lateral movements. There were no adhesions. The uterus was fixed anteriorly in the usual way. This patient recovered, and was delivered naturally at full term. Up to the present time fourteen cases have been recorded in which laparotomy has been done for irreducible retroflexion of the gravid uterus; all the patients have recovered, and in only one case has abortion occurred.

The alternative to this operation is the artificial induction of abortion, if, indeed, this does not come on naturally. Treub has shown in a recent paper that abortion is accompanied by serious danger to life, and has collected fifty-one cases in which retroflexion of the gravid uterus terminated fatally, either previously to abortion taking place or subsequently. The principal causes of death were: septicæmia, anæmia, and cystitis, or rupture of the bladder.

Doléris is strongly of opinion that abdominal section should be performed in these cases without undue delay. This should, however, only be done if all other means, including the administration of chloroform, fail to effect reduction. It is probable that under anæsthesia many soft adhesions may be broken down by manipulation *per vaginam*, and replacement thus effected.

Doléris believes that it is necessary in each case after elevating the uterus to perform hysteropexy. The technique he adopts is, shortly, as follows: The round ligaments are seized about 1½ inches from the cornua of the uterus. A short incision is now made on each side of the middle line through the peritoneum and aponeurosis at the lower angle of the wound. A loop of the round ligament is now drawn through this, and connected with the one of the opposite side by fine catgut sutures. The round ligaments are thus fixed in the lower part of the abdominal wound. A. W. W. L.

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## GYNÆCOLOGY.

**Infection of Ovarian Cysts during Typhoid Fever—Report of Two Cases—Operation—Relapse—Recovery** (Morris J. Lewis and Roger G. Le Conte, Philadelphia: *The American Journal of the Medical Sciences*, vol. cxxiv., October, 1902).—The authors report two cases of this interesting complication very fully, and give short abstracts and references to the seven cases that have been previously reported.

They consider their two cases worthy of report for the following reasons:

1. The condition is rare. They have been able to collect only seven cases, although this rarity is probably due to the fact that it is only during the last twelve years that recognition and cultivation of the typhoid bacillus have been possible. Several cases are on record, before 1890, of suppurating ovarian cysts in which an antecedent attack of typhoid had been noted.

2. They are the only cases the authors can find in which a relapse in the fever occurred immediately following the surgical procedures. In the other recorded cases the convalescence was uneventful.

3. With the exception of Sudeck's case, they are the only ones that were operated upon within a few weeks of the commencement of the fever. In the other cases three to eight months elapsed before operation was undertaken. G. H. A. C. B.

**Acute General Gonorrhœal Peritonitis** (GUY L. HAMER and NORMAN MAC L. HARRIS: *Bulletin of the Johns Hopkins Hospital*, vol. xiii., No. 135, June, 1902).—The authors, in pointing out that it is now universally admitted that the gonococcus may be the sole cause of an acute general peritonitis, state that the first observers to prove this were Frank of Louisville in 1895 and Mejia of Paris in 1897, whilst credit is due to Wertheim for having, in 1892, demonstrated that gonococci could live upon the human peritoneum. Whilst the etiologic rôle of the gonococcus may now be considered as conclusively proven, the questions of prognosis and treatment are still unsettled. The authors report, with full clinical, operative, and pathological notes, seven cases of their own. Ages respectively 10, 25, 20, 19, 19, 14, 5½ years. They analyze the cases reported by Cushing, Brunn, Frank, Doederlein, Witisch, Dowd, and Koehler, which, together with their own, total 39. Sixty-nine per cent. recovered, and this indicates a good prognosis in this disease as compared with general peritonitis considered in all its etiologic forms. The figures also show 79 per cent. of recoveries in operative cases against 53 per cent. among those not operated on, but the authors think a closer study of individual cases demonstrates the fact that the above statistics do not truly represent the merits of the two different methods of treatment. The experience gained from a series of nine cases of general peritonitis due to the gonococcus studied in the Johns Hopkins Hospital, together with a review of the literature, convince the authors that surgical measures in gonorrhœal peritonitis are of doubtful therapeutic value. The question of differential diagnosis will, however, always need careful consideration, and when there is any reasonable doubt operation should be performed. The picture of a general peritonitis arising

from a gonorrhœal infection is more characteristic in its preliminary phases than general peritonitis due to appendicitis; for instance, a history of leucorrhœa of recent date or long standing, with the discovery of gonococci in the cervical, vaginal, urethral, or glandular secretions, the history of pelvic pain and tenderness, a mass in one or both ovarian regions, makes the diagnosis probable; and if, in addition, a general peritonitis accompanies the above conditions, and has occurred immediately after the manipulation of pus-tubes, or during the menstrual period or puerperium, the diagnosis is almost a matter of certainty. If cœliotomy is performed and a dry plastic peritonitis, characteristic of gonorrhœal infection, discovered, the intestines should be disturbed as little as possible, there being great danger of the loops adhering in malposition, and giving rise to intestinal obstruction (*vide* Chaput's case and Case II. of the authors).

If the tubes contain an appreciable quantity of pus they should be removed, but if they contain no pus their removal is of doubtful value, and the more progressive gynæcologists are beginning to doubt the advisability of operation for gonorrhœal pus-tubes. The symptoms of an acute gonorrhœal peritonitis are similar to those of other forms of general peritonitis, but the clinical course of the disease is quite characteristic. After a very acute onset and unusually stormy period of from one to three days, the symptoms suddenly abate and the patient makes a rapid recovery, usually preserving as a legacy an intraperitoneal exudate, pelvic adhesions, or pus-tubes. That the disease is particularly fatal to children is due, the authors think, to the fact that children fail to receive the treatment accorded to adults; for when an adult becomes suddenly ill the first injunction is absolute rest in bed, whilst children are intolerant of this form of treatment, and are often allowed to run about till their powers of resistance have been dangerously lowered. The authors recommend as treatment, absolute rest in bed, hot turpentine stupes, alternating every half-hour with hot-water stupes, mild catharsis, liquid diet, cold sponges for the high temperature, and stimulative treatment where necessary. A very full bibliography is given.

G. H. A. C. B.

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## CORRESPONDENCE.

PARIS, *November*, 1902.

THE new pavilions of the Maternité Hospital, which have recently been opened, are a handsome addition to the lying-in hospitals of Paris, most of which are models of their kind. The Maternité is the midwives' training-school, and is in charge of Drs. Porak and Potocki. Professor Budin, in conjunction with the architect, planned out the new buildings, and continually gave his advice during their construction. The result of this medical co-operation with the very able architect, M. Rochet, is a model hospital, which can favourably compare with the most recent of similar institutions in Germany.

The pavilions are three in number, and are arranged on the following plan:

PAVILION No. 1.—Ground floor: Bath-rooms for incoming patients, emergency ward for urgent confinements, examination room, physicians' offices. First floor: Head midwife's rooms, and rooms for the superintendent on duty. Second floor: Rooms for six assistant midwives, with parlour, dining-room, and kitchen.

PAVILION No. 2.—Ground floor—left side: Confinement ward (ten beds). Adjoining are the sterilizing chamber, bath-room, dirty-linen closet, and a small ward for isolation cases. Underneath are the rooms occupied by the midwives on duty. Right side: Theatre for lectures and operations, anæsthetizing room, cupboard for instruments and apparatus, isolation room. The theatre is arranged so that it can hold 105 separate seats, every spectator having a perfect view of the operating table. First floor: Ward for suspicious cases (sixteen beds), with isolation ward, laundry, etc., and special ward for women who desire privacy. Second floor: Isolation wards (nine in number), with their particular annexes.

PAVILION No. 3.—The ground floor and first floor have each two large wards for women after their confinement, giving a total of seventy-two beds. On the second and third floors are the rooms for the attendants (one cannot call them nurses).

The appliances are throughout of the most up-to-date description. The wash-stands are all fitted with cold and hot water. In the operating theatre and in the confinement ward the water is sterilized by means of a high-pressure boiler located outside the building. The wards are lighted by electricity, and warmed by steam at low pressure. In each pavilion patients and visitors are carried up to the upper floors in lifts. The outward appearance of the buildings is quite pleasant, and the decorations are very tasteful. The expenses of the whole undertaking amount to £44,000, but the result is highly gratifying to all concerned, and the new hospital is well worth a visit.

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Paris University vacations last from June 30 to November 1. During this long period students are left pretty much to themselves. This year several of the younger physicians and surgeons in the hospitals de-

cided to give a series of lectures and demonstrations in October, thus meeting a long-felt want. Among them we notice a series of practical demonstrations in gynæcology by Dr. Jayle, *chef de clinique* to Professor Pozzi, and in midwifery by Dr. Potocki, assistant professor at the University. Moreover, Dr. Zimmern has been giving a series of lectures on the applications of electricity to treatment in gynæcological cases. All these classes have been remarkably well attended, so much so that Dr. Jayle, for instance, has been obliged to give a second series of demonstrations in November. The following programme of his demonstrations gives a fair idea of their practical value: How to question a patient; Physical examination, palpation and bimanual examination; The use of the speculum and hysterometer; Different positions for gynæcological examinations; Choice of a speculum and of an examining table; Choice of instruments for minor gynæcological surgery; Vaginal dressings and topical applications to the abdomen; Rules of medical treatment in gynæcology.

Dr. Zimmern lectured on the electrical treatment of menstrual troubles, metritis, subinvolution, deviation, fibroids, salpingitis. He also referred to the use of massage, electricity, and mineral waters in pelvic neuralgia, ovarian insufficiency, and constipation.

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A new method has just been recommended for abdominal hysterectomy in case of fibroids. This is the technic as described by Dr. Faure: The uterus being tilted forward, the operator introduces a pair of scissors in Douglas's cul-de-sac; then, turning the blades forwards, he cuts the uterus at the isthmus and separates the cervix from the corpus. The fingers are then slipped in between those two parts, and following the anterior aspect of the womb, separate it from the bladder and break through the vesico-uterine cul-de-sac. Nothing now remains but the broad ligaments, which are divided, then handled in the ordinary way. The swiftness of this method is remarkable. Dr. Faure claims to have removed in seventy-five seconds a very large myomatous uterus.

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At the last meeting of the Anatomical Society Dr. Morestin referred to a method for operating upon ovarian cysts, the aim being to leave a hidden scar. This method has already been used by Professor Pozzi. The skin is incised horizontally above the pubes in the hairy part. The abdominal wall is then divided vertically, and the cyst is punctured through this opening. Finally, the collapsed cyst itself is removed.

At this same meeting Dr. Morestin reported a case of ovarian tumour complicating pregnancy. The pedicle got twisted, and at the same time the lower part of the ileum was squeezed between the tumour and the pelvic brim. The diagnosis was appendicitis. Laparotomy was performed. Abortion took place soon after. Ultimately the patient made a good recovery.

---

Dr. Chaleix Vivie, of Bordeaux, has been experimenting for some time past with powdered methylene blue as a treatment in metritis. He claims

it to be an excellent intra-uterine application odourless, harmless, and not caustic. Its effects are very marked and very rapid in metrorrhagia, menorrhagia, and leucorrhœa. In cases of dysmenorrhœa its soothing effects are quite noticeable. Owing to its great diffusibility, it is particularly useful in pregnancy when there is any metritis or vaginitis present. Experiments have proved it to be a powerful antiseptic, and its action is beyond question in cases of infection by gonococcus, streptococcus, staphylococcus, and bacterium coli.

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As a sequel to their elementary course of lectures on gynæcology, Drs. Jayle, Beaussenat, Zimmern, and Bender have just started a series of post-graduate courses at the Broca Hospital. Dr. Jayle treats of 'Gynæcological Semeiology,' and his lectures embody the following subjects: (1) How to question a patient; (2) How to question a patient previously operated upon; (3) On the functions of the ovarian gland; (4) On gynæcological examination; (5) Examination of the abdomen; (6-9) Clinical examinations by the students; (10) Vaginal dressings; (11) Uterine dressings; (12) On the importance of diet in gynæcology.

In his lectures Dr. Beaussenat studies the clinical examination of cases in particular and their surgical treatment. The following is the order of the lectures: (1) Clinical examination of non-suppurative adnexitis; (2) Clinical examination of cervical metritis; (3) Clinical examination of fibroids; (4) Clinical examination of cancer; (5) Clinical examination of pyosalpinx; (6) Clinical examination of uterine deviations; (7) Clinical examination of uterine prolapse; (8) Clinical examination of pelvi-peritonitis; (9) Surgical treatment of adnexitis; (10) Surgical treatment of fibroids; (11) Surgical treatment of cancer; (12) Surgical treatment of metritis and uterine prolapse.

Dr. Zimmern considers the following subjects: (1) General applications of hydrotherapy, massage, and sismotherapy to the treatment of gynæcological cases; (2) Technics of the applications of electricity to gynæcological therapeutics; (3) Physical treatment of diseases of the vulva and vagina; (4) Treatment of menstrual troubles (amenorrhœa, dysmenorrhœa); (5) Treatment of metritis; (6) Indications for mineral water cures in metritis; (7) Treatment of deviations and of genital ptosis; (8) Utilization of physical agents in non-operable tumours; (9) Treatment of non-suppurative adnexitis; (10) Treatment of pelvic neuralgia and of ovarian insufficiency; (11) Physical treatment of some diseases of the urinary tract in woman; (12) Treatment of constipation and of entero-colitis.

Dr. Bender's twelve lectures are devoted to pathological and bacteriological diagnosis in gynæcology, and the application to gynæcological cases of the recent methods used in biology, hæmatology, cyto-diagnosis, etc.

These lectures are delivered before a limited number of students, each student having in this way the advantages of individual tuition. The fee is £2 for each course, and the fact of the student having to pay for his work is a splendid stimulus to his zeal. These lectures well deserve to be

noticed, as they constitute a new departure in the teaching of gynæcology in France, for up to quite a recent date this teaching had been unofficial, free, and purely theoretical. The lead in this system of paying lectures was taken by the accoucheurs, and we must mention those that are being delivered by the staff of Professor Pinard's lying-in hospital (the famous Clinique Baudelocque). These comprise practical lessons with operative exercises, and are extremely well attended.

---

The Annual French Congress of Surgery was held in Paris from October 20 to October 25. The papers in the Gynæcological section were few in number and of very average kind. This fact is due to the recent Congress at Rome, where French surgeons and accoucheurs were very much to the front.

Dr. Demous (of Bordeaux) drew attention to a particular phase in the evolution of fibroids of ovaries and broad ligaments. The patients frequently have ascites, sometimes œdema of the legs and pleural effusions; cachexy is often very marked, and nearly always surgeons refuse to operate, convinced as they are that they are dealing with advanced malignant disease. Dr. Demous has operated upon three cases of this kind, and with complete success, all distressing symptoms disappearing after the operation.

---

While the Surgical Congress was being held in the large theatre of the Faculty of Medicine, another congress and a smaller one, that of Urinary Diseases, was at work in an adjoining lecture-room. Here Dr. Guiard read an interesting report on the rôle played by latent gonorrhœa in women. The following are the conclusions of this report: 'Very often women give gonorrhœa although the most careful examination, even with the speculum, is quite unable to trace the slightest lesion in their genital tract. This, of course, does not prove that gonorrhœa can come into existence of itself, without contagion, for in those cases bacteriological examination reveals the hidden presence of gonococci in the urethra, or in the uterine cervix, or in the secretions of the vulvo-vaginal glands; and the persistence of latent gonorrhœa in women is almost indefinite. If a man has been holding sexual intercourse with only one woman, and this within a reasonable period, and if he gets gonorrhœa, it is safe to assert that the woman had one or more hidden infectious foci in one or several parts of her genitalia. In practice this is an important consideration, for in a similar case the gynæcologist should suspect latent gonorrhœa in the woman, and immediately take preventive and curative measures, whatever might be the appearances.'

---

At the last meeting of the Society of Obstetrics, Gynæcology, and Pediatrics, Professor Pinard reported a most interesting case of cholecystitis mistaken for puerperal sepsis. After confinement the woman received a uterine douche, which was followed immediately by extreme agitation, rapid pulse (130), violent abdominal pains lasting several hours.

The thermometer reached 102°, and vomiting set in. Another uterine douche was attended with similar results. Moreover, there were violent pains all along the colon, bloody diarrhœa, œdema of the tongue, foul breath, and general muscular tenderness.

These symptoms lasted ten days. It was then possible to perceive in the region of the gall-bladder an indurated mass, extremely painful. The diagnosis was cholecystitis, and the operation revealed the presence of localized peritonitis surrounding the gall-bladder, which was inflamed and distended by about a pint of pus. No calculus was found at the operation, but in the course of the week a stone of the size of a nut was found in the dressing. The patient made a good recovery.

This case, says Professor Pinard, shows how careful one must be in cases of fever following childbirth, and not lightly diagnose puerperal sepsis without having thoroughly examined every organ.

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## THE FOLLOWING PUBLICATIONS HAVE BEEN RECEIVED.

DELLA ISTERECTOMIA NEL PARTO E NEL PUERPERIO. Del Dott. Giuseppe Trotta. Napoli, 1902.

MEDICAL MONOGRAPH SERIES: ANÆSTHETICS. By J. Blumfeld, M.D. Cantab. London: Baillière, Tindall and Cox, 1902.

RECORD OF THE JUBILEE CELEBRATIONS AT OWENS COLLEGE. Issued by the Committee of the *Owens College Union Magazine*. Manchester: Sherratt and Hughes.

A TEXT-BOOK OF THE SCIENCE AND ART OF OBSTETRICS. By Henry J. Garrigues, A.M., M.D. Philadelphia and London: J. B. Lippincott.

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## NOTE.

*Owing to pressure upon our space we are compelled to hold over until our next issue the* REPORTS OF SOCIETIES *and* REVIEWS.—ED.

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# The Journal of Obstetrics and Gynæcology of the British Empire

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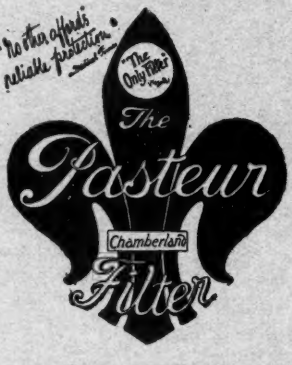


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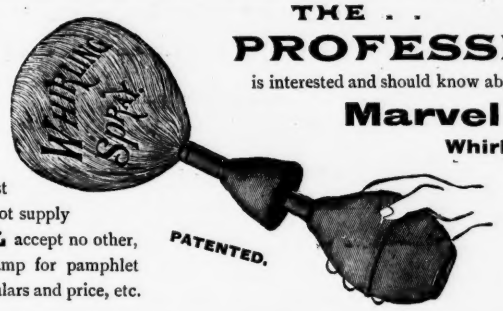


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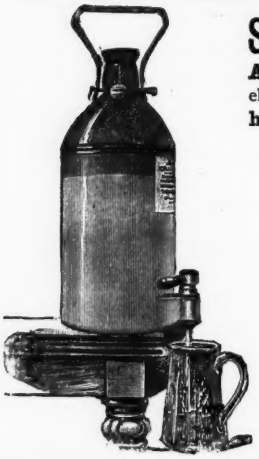

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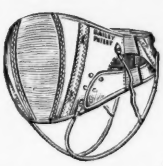

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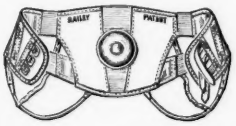

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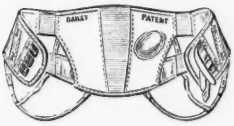

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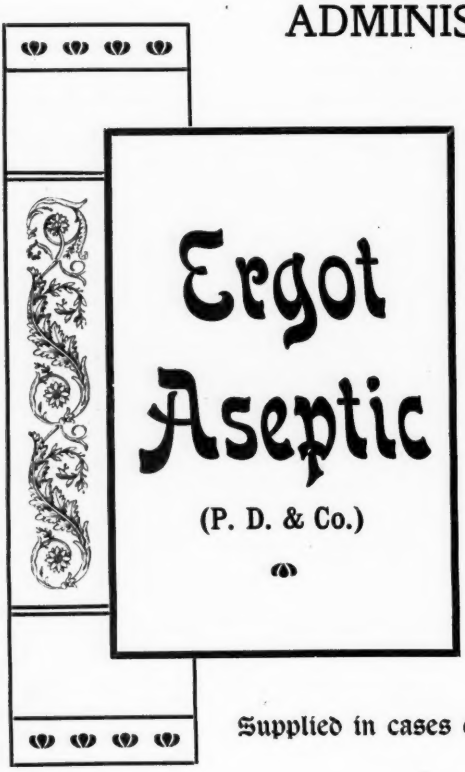


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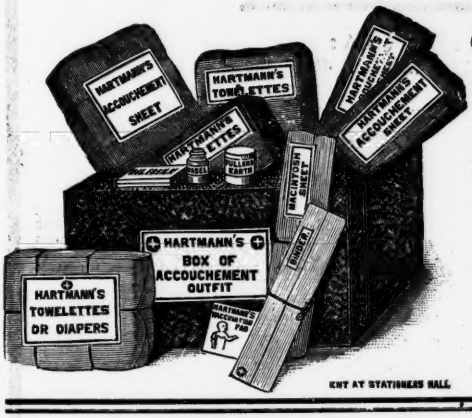


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*To face last page of text.*

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